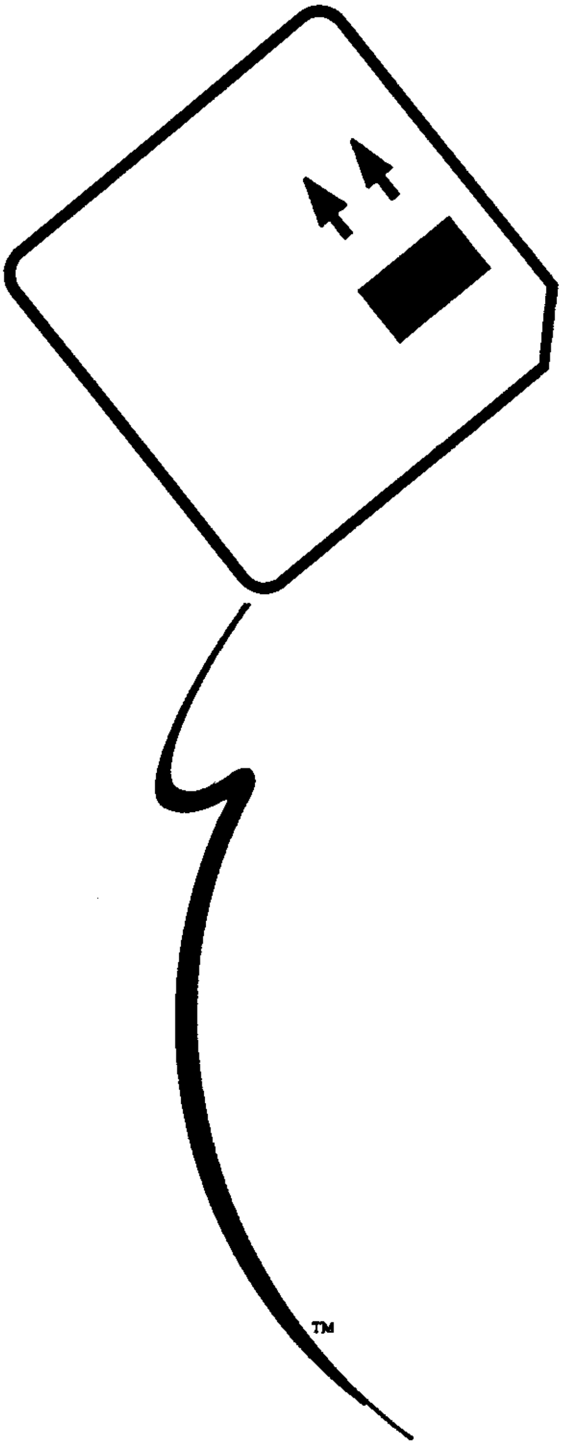

Mac+][©

Handbook

**An Applesoft and 6502 emulator
for the Macintosh™.**

meacom jrd

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Introduction.

This manual does not intend to discuss the theory of APPLESOFT programming or software developing. It is only a handbook and contains sufficient material to be useful to MAC+][users. For more information and discussion on BASIC and machine language programming, the reader will refer to its usual APPLE][library. Some excellent and complete books have been published on the matter.

This handbook is divided in four major parts:
-Applesoft
-Monitor
-MAC DOS
-MAC COM

Applesoft, Integer and machine-language are accessible when the Macintosh has been booted with MAC+][.
MAC DOS is the disk operating system of MAC+][. It is fully compatible with the APPLE][+ common DOS.
MAC COM is the communication program between MAC+][and Apple][+.

MAC+][is a true APPLESOFT emulator. Readers used to programming and running APPLESOFT applications will find it interesting to be able to transfer (with MAC COM) all files and APPLESOFT programs on the Macintosh. Some users may have developed important applications and will be able to keep them in use even if they decide to change from an APPLE][or][+ to a Macintosh.
MAC+][also allows programming in Integer BASIC and machine language of the APPLE][as well as machine language of the 68000. The transfer of Integer and machine-language files from an Apple][to a Macintosh is made possible with MAC COM, but modifications in the graphics pages commands may be required before you can run machine-language programs on the Macintosh.

MAC+][has been developed and MAC DOS adapted by David Hemmo. MAC COM has been developed by Machiavel and Marc Moini.

The MAC+][handbook was written with the help of the Apple Computer Disk Operating System Instructional and Reference Manual DOS 3.2 ISBN 030001101, the Apple Computer Basic Programming Reference Manual ISBN 030001303, and the Apple][Reference Manual ISBN 030000401.

Don't forget :
When you boot MAC+][on the Macintosh, you are in front of an APPLE][+, and the gigantic library of programs available to this computer is opened to you.

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APPLESOFT.

STARTUP PROCEDURE

Power up or reset Macintosh, then boot Mac+][disk in the Macintosh main drive.
The program is loaded then the disk ejected. APPLESOFT is now loaded in your Macintosh.
MAC+][instructions are the same as APPLESOFT's. Now load MAC DOS.(see p.17).

WARNING: If you try to read MAC DOS disk or any other disk created to work under MAC+][before you boot MAC +][, you will get the error message:
This is not a Macintosh disk. Do you want to initialize?
At this time >>> **"Eject" the disk** <<< if you do not want the disk to be erased.

SYNTAX CONVENTIONS

note: in the COS(X) or CHR$(Y) statements,
X and Y are called **arguments** of COS or CHR$ **functions.**

In this manual APPLE][refers to both APPLE][and APPLE][+.
<CR> means Return.

Tips

1) **To eject a disk**:
command shift 1 for the internal drive.
command shift 2 for the external drive.

2) To change from **APPLESOFT to INTEGER**, type BRUN INTBASIC <CR>.
To change from **INTEGER to APPLESOFT**, type BRUN FPBASIC <CR>.

3) APPLE]['s **CTRL key** is **Option key** on Macintosh
CTRL X or Option X means: you hold down the Option key while pressing the X key.

4) POKE 33,X : sets the width of the screen to X characters. Avoid X>40.

INTERACTIVE AND PROGRAM MODES

a) **Interactive mode**
In this mode an instruction is immediately executed when a <CR> terminates it:

Ex: PRINT 2+2 <CR> immediately displays '4' on the next line.

b) **Program mode**
Ex:
```
10 PRINT 2+2 <CR>
20 PRINT 2*3 <CR>
```

Such a sequence is called a Program. APPLESOFT does not execute it until you type RUN <CR>. APPLESOFT executes each line of the program in numerical ascending order.
In this example the program will display:
```
4
6
```

VARIABLES

Every variable has a NAME or Identifier, XY, XY$, UBU are Names, Y represents either a letter or a numeric variable. An identifier can have several characters, only the first two are taken into account by APPLESOFT.
for example: MONDAY and MORNING are regarded as the same variable name.
A variable is invalid if it contains some BASIC command or Reserved Word within the name.
for example: RGOSUB, DRAWing, HANDLE (see page 29).
Every variable has a TYPE: real, integer, characters, strings, are different types of variables.

-Simple Variables

Type	**Name**	**Range**
REAL	XY	+/-9.99999999E+37
INTEGER	Z%	+/-32767
CHARACTERS	ST$	255 characters

(Character variable names always end with a dollar sign '$'.)
(Integer variable names always end with a percent sign '%')

-Arrays

The size of an array is limited by the memory locations available.

Type	**Example**
REAL	XY(4,3,13)
INTEGER	Z(4,3,13)
STRINGS	YZ$(4,3,13)

OPERATORS

The Arithmetic Operators

=	assigns a value to a variable (The LET statement is not compulsory, see I/O Commands).
-	change sign of the following arithmetic value
^	exponentiation
*	multiplication
/	division
+	addition
-	subtraction

The Logical Operators

=	equal to
<> or ><	not equal to
<	greater than
>	less than
<=	less than or equal to
>=	greater than or equal to
NOT	}
AND	} 3 logical operators
OR	}

POS(0)

Displays the position of the cursor on the current line (0 to 39).

REM XYZ

During execution this line is ignored. A REMark statement is not acted upon by the computer.

SPC(X)

Is used with the PRINT statement. Prints X blank spaces after the last character printed.

```
200  PRINT "I";SPC(3);"Hate";SPC(3);"Mosquitoes."
```

SPEED=X

Controls the printing speed on the screen (0 to 255, 0 being the slowest).

TAB(X)

Is used with the PRINT statement to enhanced it. Moves the cursor to the Xth position of the current line(1 to 255) before printing. If X is greater than the actual cursor position, TAB moves the cursor to the Xth position starting from the left margin of the actual line. If X is less than the actual position of the cursor, TAB is ignored.

VTAB Y

Moves the cursor in a vertical direction at the Yth line, (1<Y<24).

ESCAPE MODE : ~ key (do not press shift)

~: put the computer in Escape Mode (ESC).
(the ~ key of Macintosh emulates the ESC key of APPLE][).

A: Moves the cursor one position to the right, and exits ESC mode.
B: Moves the cursor one position to the left, and exits ESC mode.
C: Moves the cursor one position down, and exits ESC mode.
D: Moves the cursor one position up, and exits ESC mode.

E: Clears to the end of the line and exits ESC mode.
F: Clears the screen of all characters following the cursor and exits ESC mode.

I:Moves the cursor one position up, and stays in ESC mode.
J: Moves the cursor one position to the left, and stays in ESC mode.

K: Moves the cursor one position to the right, and stays in ESC mode.
M: Moves the cursor one position down, and stays in ESC mode.

@: Clears the entire screen and exits ESC mode.

APPLE][CONTROL KEYS

Right-pointing arrow] : Moves the cursor to the right, selects and stores characters over which the cursor passed.
Left-pointing arrow [: Moves the cursor to the left, and erases characters over which the cursor passed.
To type '[' and ']' as characters, type 'Shift [' or 'Shift]'. '{' and '}' are disabled.

OPTION X: clears the current line.
OPTION C:Used in immediate mode to stop the execution of a program or abort printing on the screen.
OPTION S: Used in immediate mode to momentarily stop the printing on the screen.

GENERAL AND DIRECT MEMORY ACCESS COMMANDS

CALL X	Runs machine-code subroutine starting at address X. CALL-151 calls the Monitor.
CONT	Resumes execution of a paused program at the specified line. Execution will not be resumed if the program was modified or an error occured.
DSP *variable-names*	In INTEGER BASIC, displays the values of variables *variable-names* during program execution (INTEGER BASIC only.)
END	Terminates the program execution.
HIMEM:	Sets the highest usable memory address for APPLESOFT, ex: HIMEM:32000
LOMEM:	Sets the lowest usable memory address for APPLESOFT.
Macintosh interrupt switch	Acts as the reset key of APPLE][, stops program execution and returns to BASIC. (This key is found on the left side of the Macintosh.)
NEW	Erases the program and resets memory.
NOTRACE	Cancels TRACE
PEEK(X)	Displays the decimal value of the byte at memory location X, (0<X<65535).
POKE X,Y	Write Y in memory location X, (0<Y<255).
RUN	Resets all variables and character strings and execute the program.
RUN X	Execute the program starting at line X.
STOP	Terminates the program execution but behaves like a Option C, displaying the message: BREAK IN *line-number*, line number where the program was stopped.
TRACE	Prints out the line number of each executed statement of the program.

GET *variable-name$*

This statement is used to assign a one digit keyboard input to a string. There is no need to type <CR>.

INPUT *variable-names,*
INPUT *message,variable-names*

This statement is used to assign keyboard input to variables. A '?' or the message is displayed, waiting for the keyboard input.

IN#6

Reads the next data from the disk drive.(IN#0, reads from the keyboard). IN#6 is used like PR#6 to boot from a disk drive.

LET *variable=value*

This is the assignement statement, which is used to assign values to variables. LET is not compulsory: '*variable = value* '.

PRINT "X=";X or ?"X=";X

This statement prints X= followed by the numeric value of X. There is a difference between PRINT A;B;C and PRINT A,B,C.

PR#1

Directs the output to the printer.(PR#0,directs the ouput to the screen).

READ *variable-names*

Reads values from DATA statements and assigns them to variables.

RESTORE

Restore the data pointer back to the first DATA item.

STATEMENTS AND FLOW CONTROL

FOR...TO...STEP NEXT

This construct defines a loop which is repeated until the loop passes a specific value. The STEP size may be positive or negative.

GOTO *line-number*

Transfer program execution to the specified line.

GOSUB *line-number*

This statement transfers the program execution to the subroutine at the specified line.

IF *boolean-expression* THEN *statement*

This statement provides conditional branching.
If the boolean expression is true the program executes the statement.

ONERR GOTO *line number*

This statement defines and enables an event-initiated branch which results from a trappable error. In case of an error, the program branches to the defined line.

ON X GOTO *line-number* A, *line-number* B, *line-number* C

Branches the program to line A if X=1 ,B if X=2, or C if X=3, otherwise executes the next line.

ON X GOSUB *line-number* A, *line-number* B, *line-number* C

Branches the program to subroutine at line A if X=1 ,B if X=2, or C if X=3, otherwise executes the next line.

POP

This statement causes the next RETURN command to return the program execution to the line invoking the preceeding GOSUB or the main routine, rather than the line following the invoking GOSUB.

RESUME

Close a subroutine ONERR GOTO and branch execution to the instruction where the error occured.

RETURN

This statement returns the program execution to the instruction following the invoking GOSUB.

NUMERIC FUNCTIONS

Four trigonometric functions are available: SIN, COS, TAN, ATN which compute the Sine, Cosine, Tangent, and Arctangent, respectively. Argument values are in radians, not in degrees.

ABS*(argument)*

Returns the absolute value of the argument.

EXP*(argument)*

Gives the natural exponentiation of the argument. EXP(x)= e^x.

LOG *(agument)*

Gives the natural logarithm of the argument. LOG(e^x)= x.

INT*(argument)*

Returns the greatest integer which is less than or equal to the argument.

RND*(argument)*

For a positive argument this statement returns a random number within the range of 0 to .999999999.
If the argument is = 0, it produces the last random number used.

SGN*(argument)*

Equals to -1,0,+1 if argument is negative, zero or positive, respectively.

SQR*(argument)*

Returns the positive square root of the argument.

GRAPHICS & MOUSE

(see appendix 4, and screen addresses p.15)

The screen can either be in TEXT mode, low-resolution graphics mode (GR) or high-resolution graphics mode (HGR), or a combination of GR and TEXT, or HGR and TEXT.

TEXT

Sets and redraws the screen for text mode.

REDRAW

Updates each pixel of the HGR screen to the current state of the HGR memory ($2000-$3FFF) or ($4000-$5FFF).

Low resolution.

GR

This statement is used to set up the screen for low-resolution graphics. The screen is composed of (40 x40) pixels. A pixel is a picture element.
(0,0) is the pixel on the top left corner of the screen.
(39,39) is the pixel on the bottom right corner of the screen.
Below the graphics zone, four lines are reserved for text.

COLOR=X

Sets the color in effect for the next pixels, (0< X<15).

HLIN X1,X2 AT Y

Draws a horizontal line from (X1,Y) to (X2,Y).

PLOT X,Y

Draws a pixel in the (X,Y) position of the screen in whatever color has been specified. X is horizontal, Y is vertical.

SCR (X,Y)

Returns the color of the (X,Y) pixel.

VLIN Y1,Y2 AT X

Draws a vertical line from (X,Y1) to (X,Y2).

High Resolution

HGR

This statement is used to set up the screen for high-resolution graphics. The screen is composed of (280 x160) pixels. A pixel is a picture element.
(0,0) is the pixel on the top left corner of the screen.
(279,159) is the pixel on the bottom right corner of the screen.
Below the graphics zone,four lines are reserved for text.

note: This statement sets up the high resolution page number 1 and clears it.

HGR2 This statement is used to set up the screen for high-resolution graphics. The screen is composed of (280x192) pixels. A pixel is a picture element.
(0,0) is the pixel on the top left corner of the screen;
(279,191) is the pixel on the bottom right corner of the screen.
HGR2 does not provide four lines of text, it uses the entire screen.
There is no analogous command for low resolution.

note: This statement sets up the high resolution page number 2 and clears it.

BLOAD *shape,* Aa

Reads a shape into memory from disk, starting at memory location a.

BSAVE *shape,* Aa, Ll

Saves a shape at memory location 'a', size of shape is 'l' memory locations.

DRAW *drawing-number* to X,Y

Draws a shape from the shape-table, beginning at pixel (X,Y) of the screen. The shape-table contains coded instructions to draw a figure.

HCOLOR=X

Sets the color to be used for the next graphics, (0< X<7).

HPLOT X,Y

Draws a pixel in the (X,Y) position of the screen in whatever color has been specified. X is horizontal, Y is vertical.

HPLOT X1,Y1 TO X2,Y2

Draws a line from pixel (X1,Y1) to pixel (X2,Y2).

ROT = X

Rotate the shape to be drawn. ROT = 16 gives an angle of 90°.

SCALE = X

Determines the scale of the shape to be drawn.

XDRAW *drawing-number* to X,Y

Similar to DRAW. The color of each point will be the complement of the one on which the shape is drawn.

MOUSE

Joystick and paddles are replaced by the Macintosh Mouse.

PDL(0),PDL(1)

Return the horizontal and vertical positions of the mouse, (0 < PDL(x) < 255).

PEEK(-16287)

Test: IF PEEK(-16287) >127, the mouse button is clicked.

example:

```
10 HGR
20 HCOLOR = 3
30 X=PDL(0)
40 Y=PDL(1)
50 IF PEEK(-16287) >127 THEN HPLOT A,B TO X,Y/2
60 PRINT X,Y
70 A=X
80 B=Y/2
90 GOTO 30
```

PRINTER.

Printing with the IMAGEWRITER.

WARNING: The Imagewriter must be switched on before a **PR#1** command is issued. **PR#1** sends the necessary control characters to the printer.

Typing **PR#1** enables the Imagewriter.
Typing **PR#0** disables the Imagewriter.

Commands:

Option I xx N:
xx is the number of characters per line, used for program listing.

Option I Option y:
Defines 'y', the 'control character' to be used to command the printer.

Option I I:
Allows the screen to be used together with the printer.

Command shift 4:
Sends the screen contents to the printer.

The printer recognizes the control characters and control sequences sent from the computer.
(See the Imagewriter User's Manual,part 1:Reference).

Printing: machine-language programming.

To print from the MONITOR, put the ASCII code of the character you want to send in the accumulator, and execute **17FE.**
WARNING: the most significant bit is reversed before transfer.
Ex: to write A on the printer: **800: A9 C1 17 FE A9 8D 17 FE 60**

KEYBOARD:

Keyboards of Apple][and Macinstosh are different.
You find below the correspondence table for the two keyboards.

APPLE][	**Macintosh**
ESC	~ (top left corner)
->	Tab or]
<-	Backspace or [
]	Shift]
[	Shift [
CTRL	Option
Reset	The Interrupt switch (left side of Macintosh)

See address $C000 in the Assembler section for the machine-language programming.

THE MONITOR.

CHAPTER 2

Access to the MONITOR is obtained by typing:

```
CALL-151 <CR>.
```

To return to **BASIC** type:

Option-C <CR> (program stays in memory).
Option-B <CR> (Erases BASIC program).
3D0G <CR> (Returns to BASIC and restores DOS).

Commands:

To **read** memory locations:

```
300 <CR>
0300- 20
<CR>
0301- 0C FD 20 ED FD 4C 00

00.F <CR>
0000- 4C 3C D4 4C 3A DB 00 00
0008- 00 00 4C 99 E1 08 00 6B
```

To **write** into memory locations:

```
300:20 0C FD 20 DA FD 00 03 <CR>
```

To **disassemble** :

```
300L <CR>
0300-         20 0C FD      JSR  $FD0C
0303-         20 DA DF      JSR  $FDDA
0306-         4C 00 03      JMP  $0300
0309-         00            BRK
030A-         00            BRK
...
```

To **move** bytes in the 64K memory:

```
1000<300.310M
```

To **compare** two bytes:

```
1000<300.310V
```

if $300 and $1000 are different you get: 0300-XX(YY)
if they are the same, then nothing happens.

To **start** a program at address 300:

```
300 G <CR>
```

To **check the registers** of the 6502:

```
Option-E <CR>
A=08 X=FF Y=01 P=00 S=7B
```

then to **modify registers** immediately type:
: 00 00 00 00 00 <CR> (for example this operation clears them).

to make a **numeric computation** on a byte:

```
1A + 26 <CR>
=40
1A - 26 <CR>
=F4
```

OPTION-P <CR> is the PR# of BASIC.
OPTION-K <CR> is the IN# of BASIC.
OPTION-Y <CR> branches direct to $3F8
I <CR> inverses video on the screen.
N <CR> put video back to normal.

24-79 L

I/O addresses.

$C000: if a key has been typed on the **keyboard**, address $C000 contains a negative value ($80 to $FF). The ASCII code is in the 7 least significant bits of $C000.Use BIT $C010 to clear key strobe.

$C050 to $C057: Screen, to switch from a display mode to another.

WARNING: if you write a machine language program or transfer such a program from an APPLE][to MAC+][, the routines concerning the graphics display may require modifications.(see Appendix 4.) There is only one GR and TEXT page.

address: hexa	 decimal			**function:**
$C050	49232	or	-16304	puts in Graphics mode
$C051	49233		-16303	puts in TEXT mode
$C052	49234		-16302	all Graphics or all TEXT
$C053	49235		-16301	Graphics and TEXT
$C054	49236		-16300	selects page 1
$C055	49237		-16299	selects page 2
$C056	49238		-16298	low-resolution GRaphics
$C057	49239		-16297	High-resolution GRaphics

Memory mapping : graphics pages

Text page	$400 -$7FF
Low-resolution page	$400 -$7FF
High-resolution page1	$2000-$3FFF
High-resolution page2	$4000-$5FFF

Mouse button test: BIT $C061
(Status register bit N=1 when button is pressed, value of $C061 ≥ $80).

Some important Monitor and Applesoft graphics routines.

$F3F6 **BKGND**

Fills the graphic screen with the color found in $1C.
This color can be: 00, 2A, 55, 7F, 80, AA, D5, or FF.
Graphic page 1 is in use if $E6 = 20.
Graphic page 2 is in use if $E6 = 40.

$F457 **HPLOTO**

Draws a point on the screen.
The vertical coordinate is in accumulator (register A).
The low byte of the horizontal coordinate is in the X register.
The high byte of the horizontal coordinate is in the Y register.

$F6EC **HCOLOR1**

This command is used to choose a color (0,7) for the next HPLOT.
The color must be put in the X register.

$FDED **COUT**

Displays the character found in accumulator (register A).

$FDDA **PRBYTE**

Displays the content of the accumulator (register A) in Hexadecimal.

$FF3A **BELL**

Displays OPTION-G (BELL).

$FD0C **RDKEY**

Wait for the next keyboard input, and put the content in register A.
(does not take ESC).

$FCA8 **WAIT**

Wait loop.

$F864 **SETCOL**

This command is used to choose a color (0,15) for the next low-resolution PLOT.
The color must be put in the accumulator (register A).

$F800 **PLOT**

Draws a low-resolution point, the coordinates of which are found in the Y register (horizontal) and the accumulator (vertical).

Remarks:

All addresses from **$C000** to **$C00F**, that have a particular function or effect can only be checked or tested with the **BIT** instruction. Nevertheless **BIT $C050** sets the graphics mode, but does not clear the screen in low-resolution mode.
It is necessary to go through the standard routines to draw on the screen.

MOUSE

JSR $FB1E or **JSR $FB25** return the PDL(X) value with X found in the X register. (see PDL(X)).

BIT $C061: bit N of status register = 1 if the button of the mouse is pressed.

PRINTER

See § 'Printer' in the Applesoft section.

MAC DOS.

CHAPTER 3.

MAC DOS is the disk operating system for MAC+][. You can execute MAC DOS commands from Applesoft, Integer, and the Monitor.

STARTUP PROCEDURE

WARNING: If you try to read the MAC DOS disk or any other disk created to work under MAC+][before you booted MAC+][, you will get the error message:
This is not a Macintosh disk. Do you want to initialize?
At this time **>>> "Eject" the disk <<<** if you do not want the disk to be erased.

-If you have not yet installed MAC+][, power up or reset the Macintosh, insert the MAC+][diskette in the Macintosh internal drive. After a few seconds the diskette is ejected, and the APPLESOFT prompt is displayed.

-Replace MAC+][with MAC DOS in the internal drive and type **PR#6** <CR>.
You can then **SAVE** your APPLESOFT, ASSEMBLER, or INTEGER programs onto $3^{1/2}$" diskettes, or **LOAD** them from $3^{1/2}$" diskettes. MAC DOS allows use of **MAC COM.**
Do not try to boot MAC DOS from an external drive. In that case eject and place the diskette in the internal drive, type Option-C <CR>, then type PR#6 again .

SYNTAX

Parameters for devices, files, records, addresses, bytes are designated by a capital letter, followed by a number. Multiple parameters can be stated in different orders, and must be separated by a comma. Parameters stated between [...] are not compulsory.

File names must immediately follow the commands to which they refer. The first character of a file name must always be a letter; only the 30 first characters of such a name are taken into account by the computer. A file name is separated from its parameters by a comma.
The word 'File' used alone designates any type of file on a diskette.
A *Field* is a sequence of characters ended by a <CR>.
<CR> means Carriage Return.

CTRL-D (chr$(4)) is to be used in BASIC programs to execute MAC DOS commands.

```
-ex:       PRINT " CATALOG " ....................... will print the word  CATALOG.
           PRINT " CTRL-D CATALOG " ......... will execute the command CATALOG.
           (CTRL-D : you hold down the Option key while pressing the D key.)
-or        10  D$=CHR$(4)  :REM  (ASCII CHR$(4) IS CTRL-D)
           20  PRINT D$ ; "CATALOG"
```

Tips
1) **To eject a disk**:
command shift 1 for the internal drive.
command shift 2 for the external drive.

2) To change from **APPLESOFT to INTEGER**, type BRUN INTBASIC <CR>.
To change from **INTEGER to APPLESOFT**, type BRUN FPBASIC <CR>.

3) APPLE]['s **CTRL key** is **Option key** on Macintosh.
CTRL X or Option X means: you hold down the Option key while pressing the X key.

4) CALL 1002, to re-connect MACDOS when it has been disconnected by a program or an error.
Exemple: if CATALOG returns ?SYNTAX ERROR.

MAC DOS PARAMETERS AND THEIR SIZE:

If the size of parameters is out of bounds, MAC DOS sends an ERROR Message.

PARAMETERS	NAMES	MINIMA	MAXIMA
SLOT	Ss	S1	S7
DRIVE	Dd	D1	D2
VOLUME	Vv	V0	V255
Sequential access files			
BYTE	Bb	B0	B32767
RELATIVE FIELD	Rp	R0	R32767
Random access files			
RECORD Size	Lj	L1	L32767
RECORD Number	Rr	R0	R32767
Binary files			
ADDRESS	An	A0	A65535
SIZE	Lj	L1	L32767
MAC DOS Commands			
PR#*slot*		PR#0	PR#7
IN#*slot*		IN#0	IN#7
MAXFILES *No of files*		MAXFILES 1	MAXFILES 16

MAC DOS COMMANDS

There are five types of MAC DOS commands:

a) General purpose commands:

CATALOG
MAXFILES
SAVE
DELETE
MON
UNLOCK
INIT
NOMON
VERIFY
LOAD
RENAME
LOCK
RUN

b) Access commands:

CHAIN
FP
INT
IN#
PR#

c) Sequential access file commands:

APPEND
READ
CLOSE
WRITE
EXEC
OPEN
POSITION

d) Random access file commands:

CLOSE
OPEN
READ
WRITE

e) Machine language file commands:

BLOAD
BRUN
BSAVE

SAVE *file-name* [,Ss][,Dd][,Vv]

Saves the resident BASIC program and gives it the name *file-name*.

WARNING: MAC DOS does not verify if there is another file *file-name* on the disk and if it is the case, overwrites it.

UNLOCK *file-name* [,Ss][,Dd][,Vv]

This statement unlocks the file *file-name* and therefore allows modification to it.

VERIFY *file-name* [,Ss][,Dd][,Vv]

Verifies if the file *file-name* was correctly saved.If an error is detected the message I/O ERROR is displayed.

b) Access commands:

CHAIN FP INT IN# PR#

CHAIN *program-name* [,Ss][,Dd][,Vv]

Runs program *program-name* (INTEGER) but does not reinitializes variables.

FP [,Ss][,Dd][,Vv]

Clears memory and installs APPLESOFT.

INT

Clears memory if INTEGER is installed otherwise answers LANGUAGE NOT AVAILABLE. To install INTEGER see: 'Tips' page 17.

IN#s

Reads from the Slot s. Installs MAC DOS s=6 . IN#0 reads subsequent data from the keyboard.

PR#s

Sends informations to the designated Slot s. Installs MAC DOS if s =6. PR#0 directs outputs to the screen.

c) Sequential access file commands:

APPEND CLOSE EXEC OPEN POSITION
READ WRITE

Note: a **FIELD** is a group of data, the last character of a FIELD is <CR>.
OPEN, READ, & WRITE cannot be used in direct mode.

APPEND *file-name* [,Ss][,Dd][,Vv]

Opens a sequential access file *file-name*, and prepares to write at the end of the file only.

CLOSE *file-name*

Completes the writing of file *file-name*, clears the buffer assigned to the file *file-name*. If no *file-name* is specified, closes all files except EXEC files.

EXEC *file-name* [,Rp][,Ss][,Dd][,Vv]

Executes successive fields of file *file-name* as if they were sent from the keyboard. With a relative field parameter, execution starts at the specified field. Fields can contain numerated BASIC instructions, direct BASIC instructions, and MAC DOS commands.

OPEN *file-name* [,Ss][,Dd][,Vv]
Opens or creates a sequential access file, gives it the name *file-name*, reserves a buffer in memory.

POSITION *file-name*,Rp
In an opened sequential access file, if the actual pointer position is at the q-th field, this statement positions the pointer to the(q+p)-th field.

READ *file-name* [,Bb]
Next INPUT or GET statement reads characters from the file *file-name*. Reading starts either at the actual pointer position on the file, or at a specified byte. The response to INPUT is a FIELD only. This statement is cancelled by any other MAC DOS instruction.

WRITE *file-name* [,Bb]
Next PRINT statements can send characters to the file *file_name*. Writing starts either at the actual pointer position on the file, or at a specified byte. This statement is cancelled by any other MAC DOS instruction.

d) Random access file commands:
CLOSE OPEN READ WRITE

CLOSE *file-name* [,Ss][,Dd][,Vv]
Completes the writing of the file *file-name*, if necessary. Clears the buffer assigned to the file *file-name*. If no *file-name* is specified, closes all files except EXEC files.

OPEN *file-name* ,Lj [,Ss][,Dd][,Vv]
Opens or creates a random access file, gives it the name *file-name*, reserves a buffer in memory and defines the length of the record (*j* bytes: the *j* parameter must be the same every time the file is opened).

READ *file-name* [,Rr][,Bb]
Next INPUT or GET statements read characters from the file *file-name*. Reading starts either at the actual pointer position on the file, or at a specified 'b' byte, or at the specified 'r' record. The response to INPUT is a FIELD only. This statement is cancelled by any other MAC DOS instruction.

e) Machine language file commands:
BLOAD BRUN BSAVE

BLOAD *file-name* [,Aa][,Ss][,Dd][,Vv]
Loads the binary file *file-name* at the memory location from where it was Bsaved, or at the specified memory location 'a'.

BRUN *file-name* [,Aa][,Ss][,Dd][,Vv]
Bloads the binary file *file-name* then jumps to the first memory location and starts execution.

BSAVE *file-name* ,Aa,Lj [,Ss][,Dd][,Vv]
Saves the first 'j' bytes of the file *file-name* on disk in drive 'd', starting from address 'a'.

MAC COM.

MAC COM is a program to transfer files from an APPLE][to another APPLE][through "Super Serial Card"s, using modems or a direct connection.
Communication from an APPLE][to **MAC+][** is made possible through an Imagewriter cable connected on one side to a "super serial card" and to the **modem** serial port of Macintosh on the other side. (see CONNECTIONS)
(APPLE][refers to both APPLE][and APPLE][+).

STARTUP PROCEDURE

WARNING: If you try to read the MAC COM disk or any other disk created to work under MAC +][before you boot MAC +][, you will get the error message:
This is not a Macintosh disk. Do you want to initialize?
At this time >>> **"Eject" the disk** <<< if you do not want the disk to be erased.
Also, make sure you have a diskette with enough space on it to receive files from MAC COM.

MAC+][and MAC DOS are loaded onto your Macintosh. Insert MAC COM disks in the APPLE][and the Macintosh. Type BRUN MAC COM<CR> on the Macintosh and PR#6 <CR> on the APPLE][. MAC COM asks which is the receiver and which is the sender.

CONNECTIONS

WARNING: before connecting or disconnecting anything turn off power. This is absolutely necessary.

Macintosh >> APPLE][
Plug one end of the Imagewriter into the **modem** serial port on the Macintosh and the other end of the cable into the Super Serial Card on the APPLE][.

APPLE][>> APPLE][
If you have connected together two APPLE][s by their Super Serial Cards, refer to fig 4-6 page 43 and table C1,C2 page 98,99 of the Super Serial Card Installation and Operating manual before you run MAC COM.You will find this: (DB-25 pinout)

APPLE][RECEIVER	APPLE][SENDER
TERMINAL	**MODEM**

```
DTR>20----------------6>DSR
DSR<6----------------20<DTR
RTS-CTS>4,5---------8>DCD
DCD<8-------------- 4,5<RTS-CTS
TXD>2-----------------3> RXD
RXD<3-----------------2<TXD
GND 1-----------------1 GND
```

This type of connection is made possible by the position of the two jumper blocks, one in the TERMINAL position the other in the MODEM position, through an RS-232C serial cable.

MAC+][>> MAC+][
Connect the two modem serial ports of the Macintosh with a straight 9 conductors cable of which line 5 and 9 are crossed at one end.

1 2 3 4 5 6 7 8 9
1 2 3 4 9 6 7 8 5

APPLE][IS THE RECEIVER CONNECTED TO AN OTHER APPLE][.

Super Serial Card configuration.
Configure the Super Serial Card as follows:

Put the card in the Terminal mode by pointing the arrow on the jumper block down toward the word TERMINAL.

Jumper block:

▽
TERMINAL

Set the switches in the configuration:

sw1
0001111

sw1.1-4: baud rate 9600
sw1.5-6: communications mode
sw1.7: RS 232-C

sw2
1111000

sw2.1-2: 8 data-1stop
sw2.3-4: no parity
sw2.5: no LF after CR
sw2.6: interrupts OFF
sw2.7: RS232-C

APPLE][IS THE RECEIVER OR THE SENDER CONNECTED TO A MAC.
APPLE][IS THE SENDER CONNECTED TO AN OTHER APPLE][.

Super Serial Card configuration.
Configure the Super Serial Card as follows:

Put the card in the Printer mode by pointing the arrow on the jumper block up toward the word MODEM.

Jumper block:
MODEM
Δ

Set the switches in the configuration:

sw1
0001111

sw1.1-4: baud rate 9600
sw1.5-6:N.A.
sw1.7: RS 232-C (CTS)

sw2
1111000

sw2.1: 8 data-1stop
sw2.2: delay 32ms <CR>
sw2.3-4: 40ch/video on
sw2.5: no LF/<CR>
sw2.6: interrupts OFF
sw2.7: RS232-C (CTS)

APPLE][IS THE SENDER

Boot MAC COM on the APPLE][with the 5" floppy disk provided and type any key on the keyboard.

The program asks the Super Serial Card slot number (1-7), then the disk drive slot number (1-7) in which there are files to transfer. A catalog of the files on this disk appears on the screen. The program asks you the name of the file to be transfered (see "COMMANDS" further down).

Type the file name and <CR>; the system will wait for the receiver, and the transfer will start when both sender and receiver are ready.

APPLE][IS THE RECEIVER

Boot MAC COM on the APPLE][with the 5" floppy disk provided and type any key on the keyboard.

The program asks the Super Serial Card slot number (1-7), then the disk drive slot number (1-7) in which the transfered files are going to arrive. A catalog of the files on this disk appears on the screen. The system then waits for the sender and transfer starts when both sender and receiver are ready. You can follow the progress of transfer on the screen of the receiver, since a dot is displayed every time a sector is transfered.

MAC+][IS THE SENDER

Mac+][and MAC DOS must be loaded in the Macintosh. Now insert MAC COM in the internal drive and type BRUN MAC COM,D1<CR>. When MAC COM is loaded, it asks you the drive number (1,2) which holds the disk containing the files to be transfered. The system displays on the screen the names of the file on this disk, and asks you the name of the file to be transfered (see "COMMANDS", below). Enter the name of the file you want to transfer. As soon as you type <CR> the system waits for the receiver, and transfer starts when both sender and receiver are ready.

MAC+][IS THE RECEIVER

Mac+][and MAC DOS must be loaded in the Macintosh. Now insert MAC COM in the internal drive and type BRUN MAC COM,D1<CR>. When MAC COM is loaded, it asks you the drive number (1,2) which holds the disk to receive the files to be transfered. The system displays the names of the file on this disk, and waits for the sender. The transfer starts when both sender and receiver are ready. You can follow the progress of transfer on the screen of the receiver, since a dot is displayed every time a sector is transfered.

COMMANDS

CTRL Q	Aborts the current operation and branches to the preceeding step.
?	When a file name is requested by MAC COM, answering ' ? ' selects all of the disk's files, and a prompt will let you confirm transfer for each file.
XX?	When a file name is requested by MAC COM, answering ' XX? ' selects all files with names starting by XX , and a prompt will let you confirm transfer for each file.
=	When a file name is requested by MAC COM, answering ' = ' selects all of the disk's files.
XX=	When a file name is requested by MAC COM, answering ' XX= ' selects all files with names starting by XX.

ERROR MESSAGES.

APPLESOFT ERROR MESSAGES

These messages are displayed as follows:
? **XX ERROR** in immediate mode
? **XX ERROR IN YY** in program mode
where **XX** is the error type (see below), and **YY** is the line at which the error occured.

code	message	cause
none	?CAN'T CONTINUE:	Attempting to resume execution of a program when: There is no program in memory An error occured since the program was paused or the program has been modified.
133	?DIVISION BY ZERO:	Attempting division by zero.
none	?ILLEGAL DIRECT:	Illegal attempt to use INPUT, DEF FN, GET, or DATA command in immediate mode.
53	?ILLEGAL QUANTITY:	Invalid argument in a function such as: Negative subscript. LOG with a negative or null argument. SQR with a negative argument. A^B with A negative and B non integer. MID$, LEFT$, RIGHT$, WAIT, PEEK, POKE, TAB, ON..GOTO, or any graphics function with an improper argument.
0	?NEXT WITHOUT FOR:	Attempting a NEXT without a matching FOR.
42	?OUT OF DATA:	Attempting a READ with no corresponding or insufficient DATA.
77	?OUT OF MEMORY:	One of the following error occured: The program is too long. The number of variable exceeds the available memory space. More than 10 levels of FOR..NEXT loops. More than 24 levels of GOSUB. More than 36 levels of nested parentheses. Expression too complex. LOMEM is set too high or lower than the present value. HIMEM is set too low.

code	message	cause
191	?FORMULA TOO COMPLEX:	More than 2 imbricated IF..THEN tests.
69	?OVERFLOW:	A number too large or too small to be handled by the computer has been entered or calculated.
120	?REDIM'D ARRAY:	Attempting to re-dimension an array.
22	?RETURN WITHOUT GOSUB:	Encountered a RETURN with no matching GOSUB.
176	?STRING TOO LONG:	A string can not have more than 255 characters.
107	?BAD SUBSCRIPT:	Subscript does not correspond to DIM statement.
16	?SYNTAX ERROR:	Missing a parenthesis. Illegal character. Incorrect punctuation...
163	?TYPE MISMATCH:	A numeric expression has been found where a string should have been or vice versa.
90	?UNDEF'D STATEMENT:	GOTO, GOSUB, or THEN branching to an undefined line number.
224	?UNDEF'D FUNCTION:	Attempting to use an undefined function.

MAC DOS ERROR MESSAGES.

code	message	cause
1	LANGUAGE NOT AVAILABLE	The language asked for is not on your diskette.
2,3	RANGE ERROR	Parameter in the instruction is too large.
4	WRITE PROTECTED	It is not possible to write on the diskette because it is write protected.
5	END OF DATA	Attempted to read beyond end-of-file.
6	FILE NOT FOUND	The requested file is not on the disk, or its name was misspelt.
7	VOLUME MISMATCH	Incorrect volume parameter.
8	I/O ERROR	Diskette is not initialized or is damaged.
9	DISK FULL	Not enough room on the disk to record another file.
10	FILE LOCKED	Attempted to write on a locked file.
11	SYNTAX ERROR	Incorrect file-name or parameter, comma missing, ect...
12	NO BUFFERS AVAILABLE	Too many files are opened at the same time.
13	FILE TYPE MISMATCH	The command does not correspond to the file type.
14	PROGRAM TOO LARGE	There is not enough memory to store the program.
15	NOT DIRECT COMMAND	This command must be used in program mode not in interactive mode..

ASCII CHARACTER CODES.

dec	hex	0 $0	16 $10	32 $20	48 $30	64 $40	80 $50	96 $60	120 $70
0	$0	nul	dle	space	0	@	P	'	p
1	$1	soh	dc1	!	1	A	Q	a	q
2	$2	stx	dc2	"	2	B	R	b	r
3	$3	etx	dc3	#	3	C	S	c	s
4	$4	eot	dc4	$	4	D	T	d	t
5	$5	enq	nak	%	5	E	U	e	u
6	$6	ack	sync	&	6	F	V	f	v
7	$7	bel	etb	'	7	G	W	g	w
8	$8	bs	can	(	8	H	X	h	x
9	$9	ht	em	)	9	I	Y	i	y
10	$A	lf	sub	*	:	J	Z	j	z
11	$B	vt	esc	+	;	K	[	k	{
12	$C	ff	fs	,	<	L	\	l	|
13	$D	cr	gs	-	=	M	]	m	}
14	$E	so	rs	.	>	N	^	n	~
15	$F	si	us	/	?	O	_	o	del

KEY CODES.

dec	hex	0 $0	16 $10	32 $20	48 $30	64 $40	80 $50
0	$0	ctrl@	ctrlP	space	0	@	P
1	$1	ctrlA	ctrlQ	!	1	A	Q
2	$2	ctrlB	ctrlR	"	2	B	R
3	$3	ctrlC	ctrlS	#	3	C	S
4	$4	ctrlD	ctrlT	$	4	D	T
5	$5	ctrlE	ctrlU	%	5	E	U
6	$6	ctrlF	ctrlV	&	6	F	V
7	$7	ctrlG	ctrlW	'	7	G	W
8	$8	ctrlH	ctrlX	(	8	H	X
9	$9	ctrlI	ctrlY	)	9	I	Y
10	$A	ctrlJ	ctrlZ	*	:	J	Z
11	$B	ctrlK	ESC	+	;	K	shft-[
12	$C	ctrlL	n/a	,	<	L	\
13	$D	ctrlM	ctrl-shM	-	=	M	shft-]
14	$E	ctrlN	ctrl^	.	>	N	^
15	$F	ctrlO	n/a	/	?	O	_

MAC+][vs APPLE][.

GRAPHIC ROUTINES

MAC+][updates the screen from memory only when expressely instructed to do so. As a result, programs that directly modify the display by writing in the screen-mapped memory will not produce any output on the screen (even though the program executes properly) as long as one of the update instructions is not invoked.

REDRAW:
From Applesoft, using the REDRAW command updates the current high resolution screen (page 1 or page 2). You may select mixed (graphics + 4 lines of text) or all-graphics mode by accessing the soft-switches at locations $C053 (decimal 49235 or -16301) and $C052 (decimal 49234 or -16302) before invoking REDRAW, using either of BASIC's POKE or PEEK statements (it doesn't matter what you read from or write to these locations, it is the mere reference to them that performs the switching).
REDRAW has no effect on the low resolution or text display. Programs writing directly to the low resolution or text screen should be modified to use the available BASIC commands (PRINT PLOT, VLIN, HLIN,...) or Monitor routines (COUT, PLOT,...).

SOFT-SWITCHES:
The $C052 and $C053 soft-switches may be used in low resolution mode, but do not update screen display. Erasing the remaining text or graphics in the bottom four line window is left to the user.
Similarly, soft-switch $C056 only selects the low resolution mode, without updating the display from the low resolution screen memory. This allows simultaneous display of low resolution graphics along with text or high resolution graphics, provided that the text or high resolution background is drawn on the screen first.
To switch from page 1 to page 2 or back while displaying high resolution graphics, a program must first switch to text mode ($C051), then switch pages ($C054 or $C055), and finally switch back to graphics ($C050).
Secondary text and low resolution pages, although present in memory, cannot be displayed by MAC+][.

The choice of having the MAC+][display behave in a different manner than an Apple]['s was made to accomodate a reasonable execution time on the emulator. In effect, MAC+][has to simulate the operation of the hardware display circuitry of an Apple][or][+ by software means, but even with the speed of the 68000 microprocessor (MAC+][is entirely written in 68000 assembly language and extensively optimized for speed and minimum memory usage), such a process reveals to be extremely time consuming, especially when switching from a display mode to another, since the whole MAC+][screen must be re-computed to reflect the state of the current Apple][display. MAC+][emulates each 6502 instruction at an average 1/6th of the speed of a regular Apple][+, which is close to the limit imposed by the hardware (the 68000 microprocessor has a clock cycle eight times shorter than the 6502, but a 68000 instruction usually requires twice as many clock cycles to execute than a 6502 instruction, bringing the speed ratio to a 1/4 basis. Since MAC+][uses an average of twenty-four 68000 instructions to emulate each 6502 instruction, the result is MAC+][being six times slower than an Apple][or][+). Adding more 68000 instructions to MAC+]['s main emulation routine for the purpose of checking whether or not to update the Macintosh display whenever the screen-mapped memory of the emulated machine is modified would have considerably slowed down normal execution, and that is the reason why the functioning of MAC+][is different from that of an Apple][or][+.

68000 MACHINE LANGUAGE

MAC+][allows use of Macintosh's 68000 microprocessor through the familiar Apple][machine language environment. Experienced Apple][users can employ their knowledge of the 6502 microprocessor to monitor routines written in 68000 machine code. An example of the added possibilities is the efficient use of interruptions, a concept built in the 68000 microprocessor that allows parts of different programs to execute at precise time intervals, giving the illusion of simultaneity to the user. Using interruptions, you could write a 68000 routine which would play some music while an Applesoft, Integer, 6502 or even a 68000 machine language program would be doing graphic animation.

MODIFYING THE APPLE][ROMS

It is possible with MAC+][to bring modifications to the code that usually resides in the ROM (Read Only Memory) part of the Apple][and][+, since this code is implemented in the RAM of Macintosh when running MAC+][. Users may patch Applesoft, Integer BASIC and the Monitor to fit their personal preferences such as adding search, sort, ..., or print-using routines to BASIC, or freeing usable program space taken-up by un-needed routines (In fact, this is how the tape I/O commands of Applesoft were removed to make room for the new REDRAW command).

400K DISK DRIVES

MAC DOS takes full advantage of Macintosh's increased disk storage capability. Whereas the standard Apple][drives were limited to 143K of disk space, MAC DOS provides on-line access to the 400K Macintosh disk drives, thus allowing MAC+][users to benefit from the newer and more convenient 3 1/2" technology.

LOWER CASE

One last small but useful addition brought by MAC+][is the ability to display lower case ASCII characters, which was not provided on the standard Apple][and Apple][+.

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Cricket Draw

Advanced Graphics with PostScript™

Program by Jim Rafferty, Dennis McFerren and Joe Zglinicki

cricket
software 215 • 387-7955
3508 Market St. Suite 206 • Philadelphia, PA 19104

This manual was produced using Full Paint™, WriteNow™, a Macintosh Plus, and a LaserWriter™.

Before you start...

Cricket Draw comes with one double-sided disk. The first thing you should do is make a copy of the original disk as a working copy. Store the original disk in a safe place.

The disk contains the Cricket Draw program, a PostScript.help file, a sample drawing and a System Folder with everything you need to print on the ImageWriter II, LaserWriter, and any PostScript-compatible printer or typesetter.

You need a Macintosh Enhanced or Macintosh Plus with the new 128K ROM and double-sided disk drive. A second disk drive is useful but not necessary. Any of the Macintosh compatible hard disks can be used since Cricket Draw is not copy-protected (as a matter of convenience for you).

A PostScript™-compatible device, such as the Apple LaserWriter™, is useful for printing, but not necessary. You can save the PostScript description of your images and send the PostScript by modem or mail to the nearest facility that has a PostScript printer or typesetter.

Any of the PostScript-compatible printers currently on the market can be used with Cricket Draw. The ImageWriter II™ can also be used for printing in color, though its output is not comparable to a PostScript printer.

Welcome and enjoy!

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Chapter 1
Introducing Cricket Draw

Cricket Draw is a powerful object-oriented drawing program designed for those who would like to create high-quality images on a PostScript printer, such as the Apple LaserWriter™.

Object-oriented refers to the fact that objects are stored as descriptions of the object rather than simply as a painting of the object. The advantage of this is that objects can easily be recreated on a wider variety of output devices at the maximum resolution of the device.

The PostScript™ language, developed by ADOBE Systems, Inc., is a programming language designed to convey a description of virtually any desired page to a printer. It is a very powerful language that is a standard in desktop publishing, as indicated by the wide number of printers that now support it.

Because Cricket Draw is object-oriented, no loss of resolution occurs regardless of which PostScript device is being used. Cricket Draw is unlike any other Macintosh drawing program in that it is designed to utilize the advanced capabilities available with the PostScript language.

Why use Cricket Draw?

Cricket Draw allows you access to all of PostScript's powerful capabilities. These capabilities require a deviation from "What You See Is What You Get". Many times, the PostScript representation on the page is much better than the screen representation on the Macintosh. We like to think of it as "What You Get Is Always Better Than What You See."

A number of useful appendices follow. Appendix A lists the current PostScript printers that are now available commercially. The MacDraw, PICT and Cricket Draw file formats are discussed in Appendix B. Appendix C may be of special interest since it discusses the use of Cricket Draw with other applications. For those wanting to program directly in PostScript, Appendix D documents the procedures used by Cricket Draw so that you may also use them. Appendix E provides a quick reference guide for each of Cricket Draw's menu selections.

Working an Example

Some of the features of Cricket Draw are illustrated in the remainder of this chapter by leading you step-by-step through an example. If you are artistically inclined, feel free to depart from the example at any time and experiment. Cricket Draw conforms to the Macintosh interface, so your experience with other Macintosh programs is helpful.

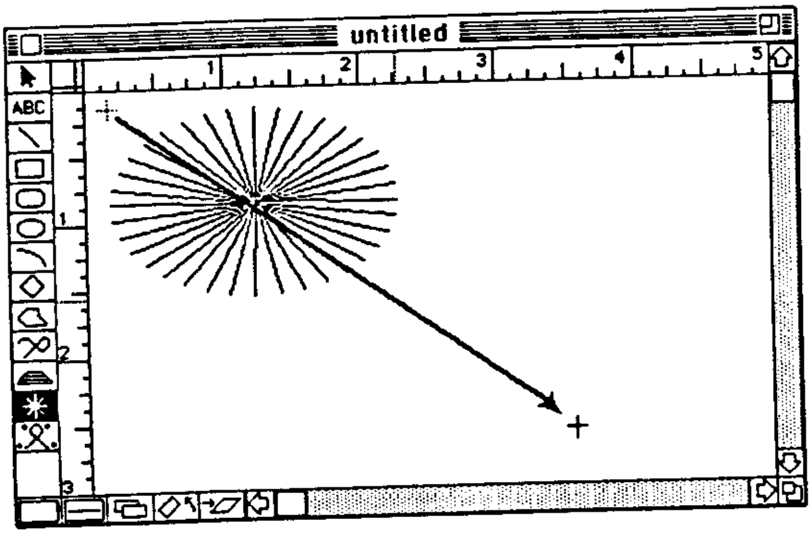
Cricket Draw requires the new 128K ROMs, so the computer should be a Macintosh 512K Enhanced or a Macintosh Plus. No other hardware is required, although an Apple LaserWriter or ImageWriter is useful.

Before beginning, you need to be familiar with a few mouse techniques that are basic to the Macintosh. Be familiar with clicking, double-clicking, shift-clicking, dragging, and using the menus. If you are not comfortable with any of these techniques, please consult the manual you received with your Macintosh. A summary of these techniques can be found in the Macintosh Plus User's Manual, pages 42 through 47.

Note: Special notes, like this, are scattered throughout this example. These notes consist of special information that is not necessary to complete the example, but is presented to further your understanding of why something is done. This information is presented for clarity.

The tool becomes highlighted and the cursor changes into a cross hair when moved into the drawing window.

Note: Objects are created in the drawing window by dragging a cross-hair cursor. Objects resize dynamically in response to the distance and direction that you drag. When you release the mouse button, the cursor changes into the arrow cursor and the object becomes selected. An object can be selected by clicking on it with the arrow cursor. A selected object has handles (small black boxes) surrounding it which are used in resizing the object.



- *Move the cross hair cursor to the upper left corner of the drawing window.*

- *Press and hold down the mouse button, then drag the cursor towards the bottom right corner of the screen to start drawing the starburst.*

The starburst continues to enlarge until you stop dragging.

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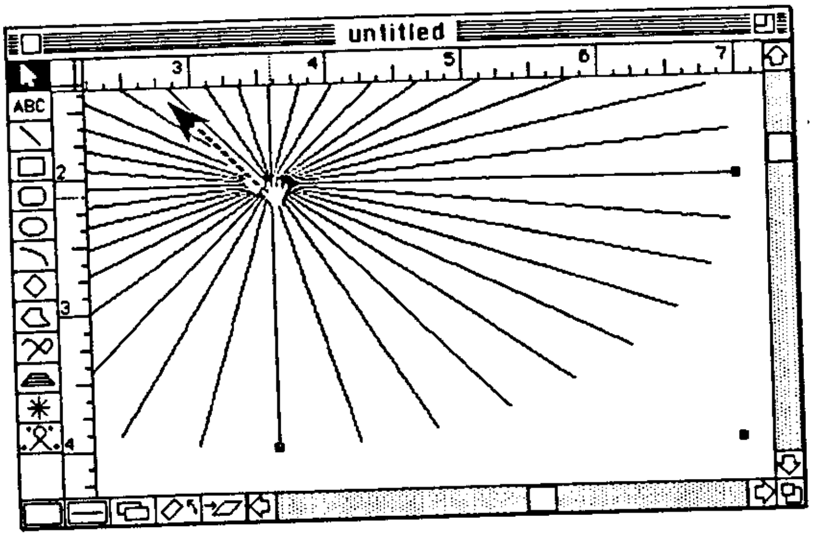

- *Position the arrow cursor at the center of the starburst.*

- *Press and hold down the mouse button.*

The cursor changes into a hand for repositioning the object.

- *Drag the starburst towards the top left corner of the window until the dotted lines inside the rulers are on the 3 inch mark of the horizontal ruler and the 1 inch mark on the vertical ruler.*

Note: All objects in Cricket Draw can be moved by this method.

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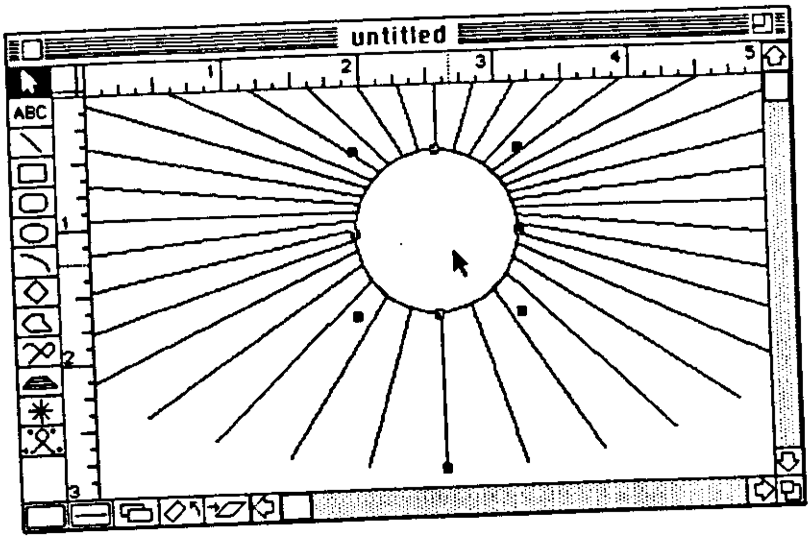
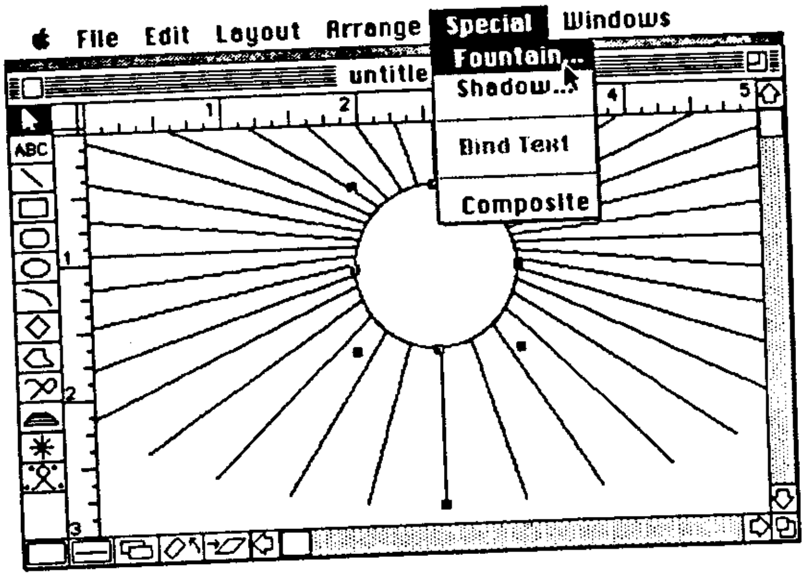
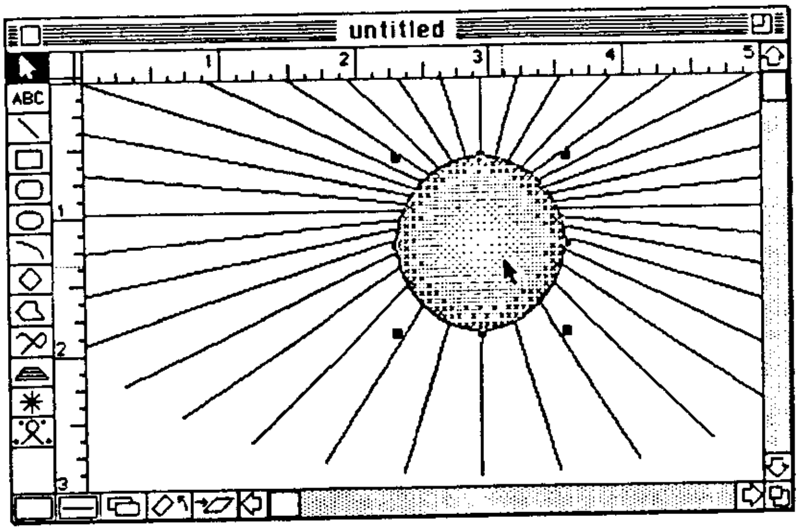


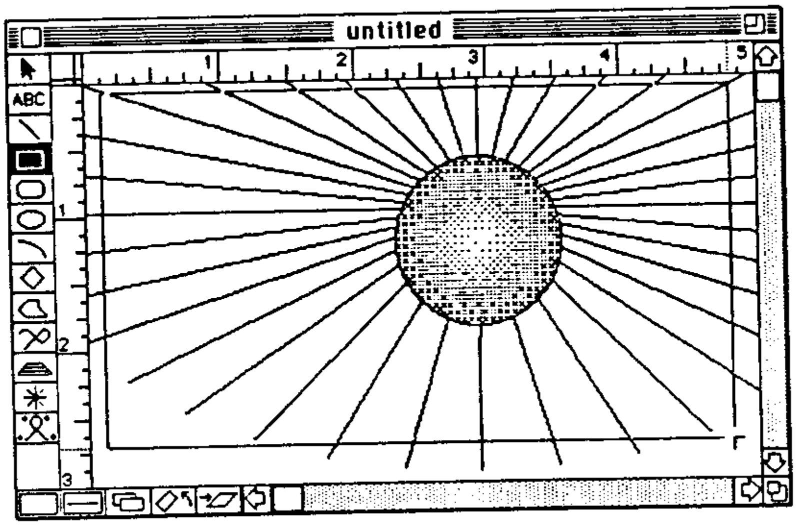
- *Select the circle by clicking on it with the arrow cursor.*



- *Select **Fountain** from the **Special** menu.*



- *Click the mouse button and a radial fountain fills the circle.*



- *Select the rectangle tool from the tools palette.*

Two Descriptions for every Drawing

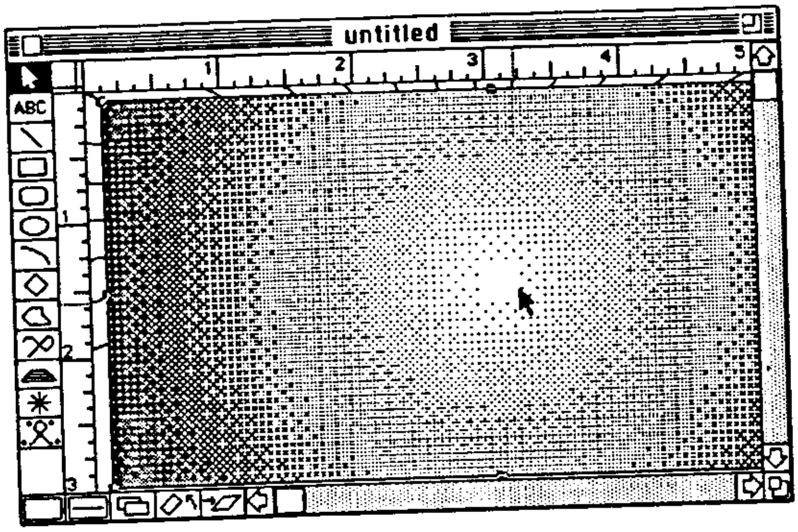
Every drawing created in Cricket Draw actually has two descriptions. There is a screen description which presents the image on the Macintosh, and a PostScript description which is used to print the image on the printer. By utilizing two separate descriptions, Cricket Draw creates the best possible image on the page while representing the image on the Macintosh screen.

Only through the use of two descriptions can the special effects obtainable in PostScript be employed. When you save an image to the disk or transfer a drawing to the Clipboard, both the Macintosh screen description and PostScript page description are transferred. This allows you to place drawings created in Cricket Draw into applications such as MacWrite™ or Aldus PageMaker™ while keeping the image exactly as you had designed it, even though the other applications do not have the inherent capability to create PostScript images like Cricket Draw does.

Overview of the Manual

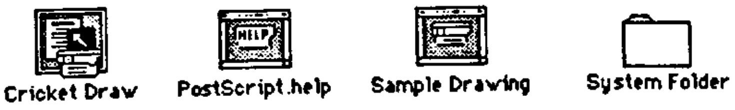
The remainder of this chapter quickly guides you through the creation of a sample image. Chapter 2 introduces you to the basic drawing window, followed by Chapter 3 which explains each of the drawing tools individually. Chapter 4 discusses how you go about editing objects once they are created. Chapter 5 talks about creating and manipulating blocks of text. Chapter 6 introduces you to some of the graphic special effects that can be created using Cricket Draw. Chapter 7 discusses the PostScript handling features available in Cricket Draw.

The fountain fills the rectangle.



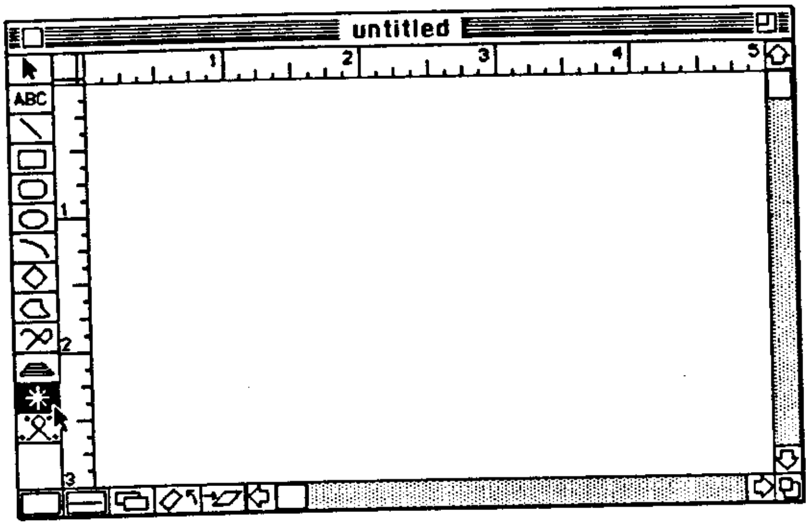
- *Use the scroll bars to return to the top-left corner of the drawing.*

- *Turn on your Macintosh and insert the Cricket Draw Program Disk.*



- *Double-click on the "Cricket Draw" icon to start the program.*

In a few seconds, you are greeted with the drawing window. Along the left side of the window is the drawing tools palette. Positioned at the bottom left of the window are the object controls. Chapter 2 contains a fully labeled diagram of the drawing window.

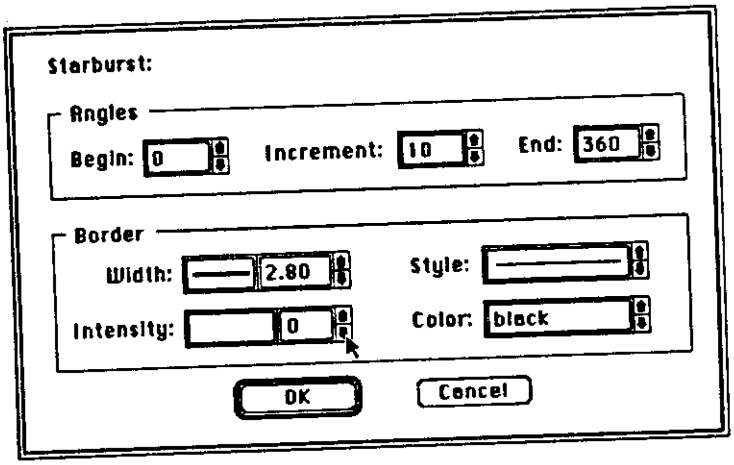


- *Select the starburst tool by positioning the arrow cursor on the starburst tool in the tools palette and clicking the mouse button.*

- *Position the cursor on the starburst and double-click.*

The starburst dialog appears.

Note: Double-clicking on an object is an essential element of Cricket Draw. All objects have certain attributes associated with them. These object-specific attributes can be accessed and modified by double-clicking on the object. For most objects, these attributes include gray intensity, line width and style, as well as color and fill information.



Starburst:

Angles

Begin: 0 Increment: 10 End: 360

Border

Width: 2.80 Style:

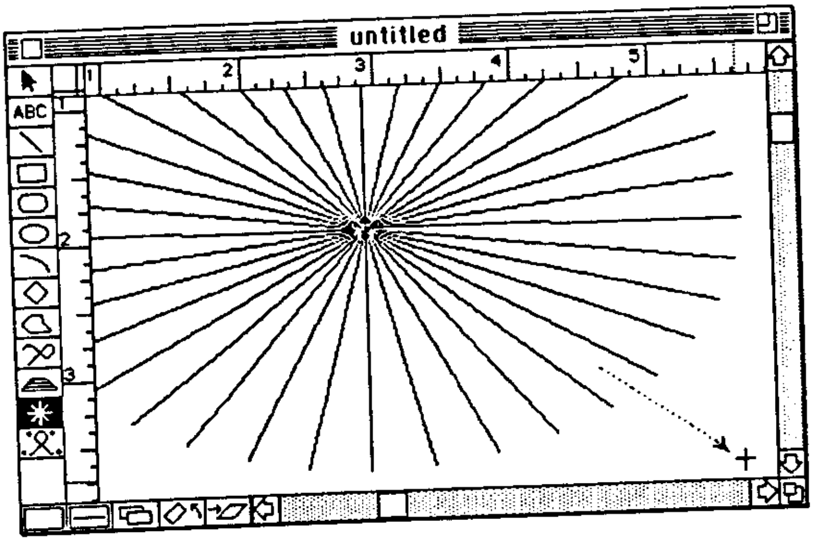
Intensity: 0 Color: black

- *Set the border line width to approximately 2.80 (the measurement is in pixels) and the intensity to 0.*

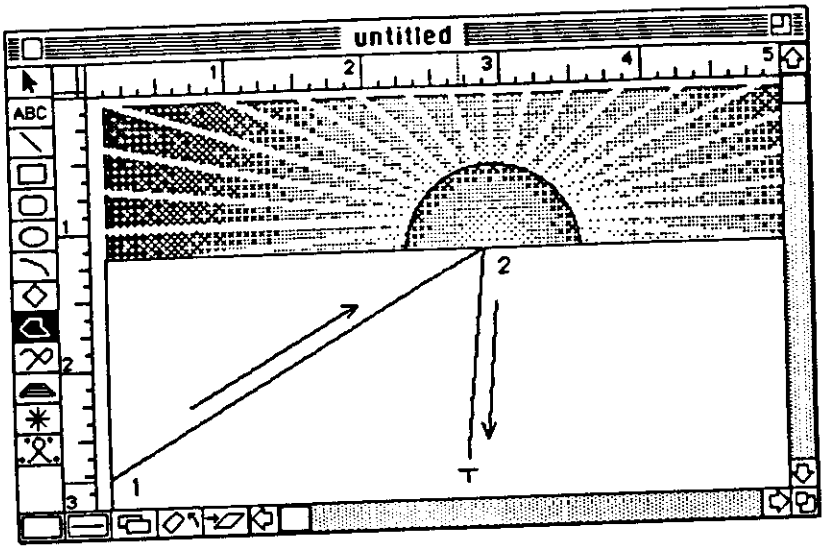
- *Click the OK button.*

- *Continue dragging until the cursor is outside the bottom right corner of the drawing window.*

Note: When objects are created, resized, or moved, dragging the cursor out of the drawing window causes the window to scroll in that direction to accomodate the action. This allows for easier handling of objects larger than the drawing window.



When the starburst is about 7 inches wide (size is not critical--use the rulers as a guide) and 4 inches tall, release the mouse button.

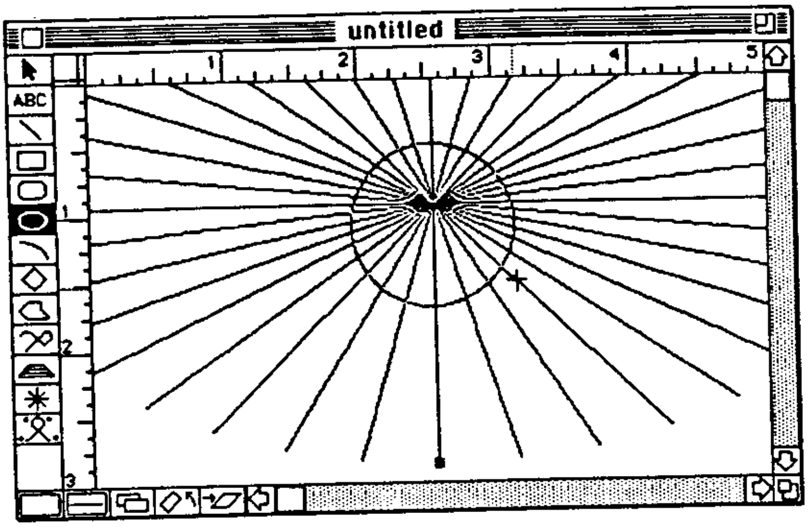


- *Select the polygon tool (just below the diamond tool).*

- *Position the cross hair cursor halfway down the left edge of the white rectangle just drawn and click to place the first vertex (#1) of the polygon.*

- *Move the cursor up to the fountained circle and click on the horizon to place another vertex (#2).*

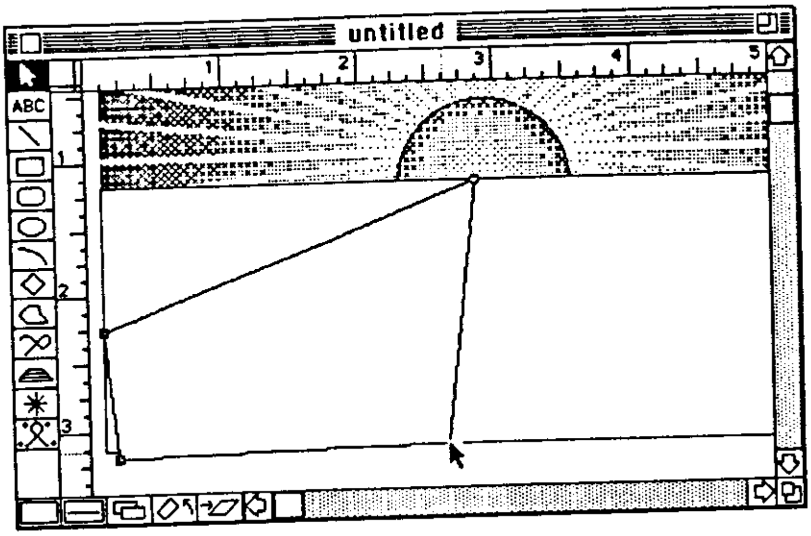
- *Move the cursor towards the bottom center of the page to place the next vertex (#3) on the bottom edge of the white rectangle. Remember that moving the cursor off of the drawing window scrolls the window in that direction.*



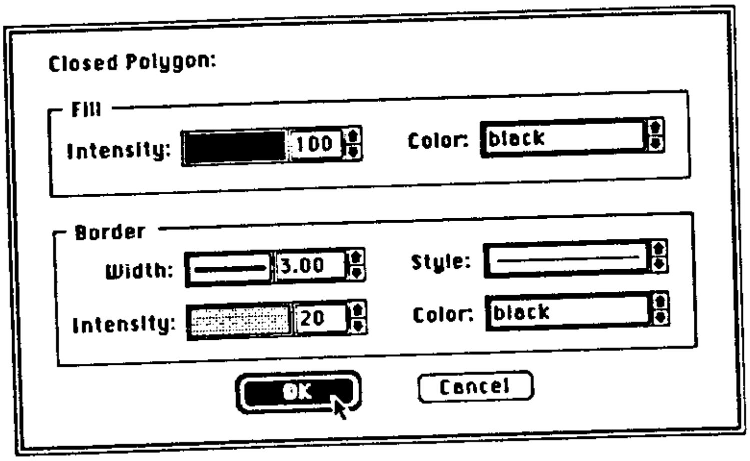
- *Select the oval tool from the tools palette.*

- *Hold down the Shift key and draw a 1 inch diameter circle using the same dragging technique as was used for drawing the starburst.*

Note: The shift key forces the object's height to always be equal to its width. This technique is called constraining and works with most objects in Cricket Draw.



- *Double-click the polygon.*



Closed Polygon:

Fill

Intensity: 100

Color: black

Border

Width: 3.00

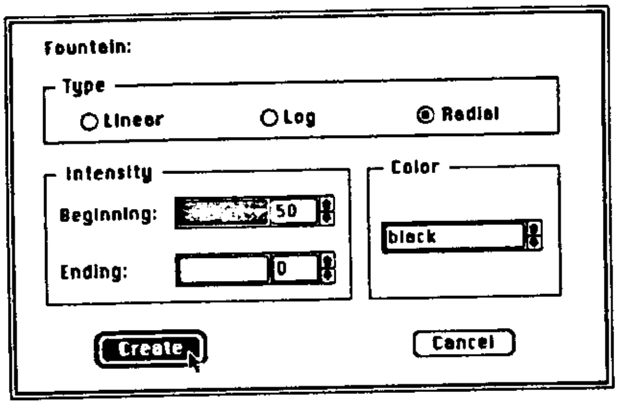
Style:

Intensity: 20

Color: black

A dialog box appears titled "Closed Polygon".

The fountain dialog appears, allowing you to set the attributes for the fountain.



Fountain:

Type

○ Linear ○ Log ● Radial

Intensity

Beginning: 50

Ending: 0

Color

black

- *Set the fountain type by clicking the* ***Radial*** *button.*

- *Reduce the beginning intensity to 50 using the control arrows on the right side of the beginning intensity control.*

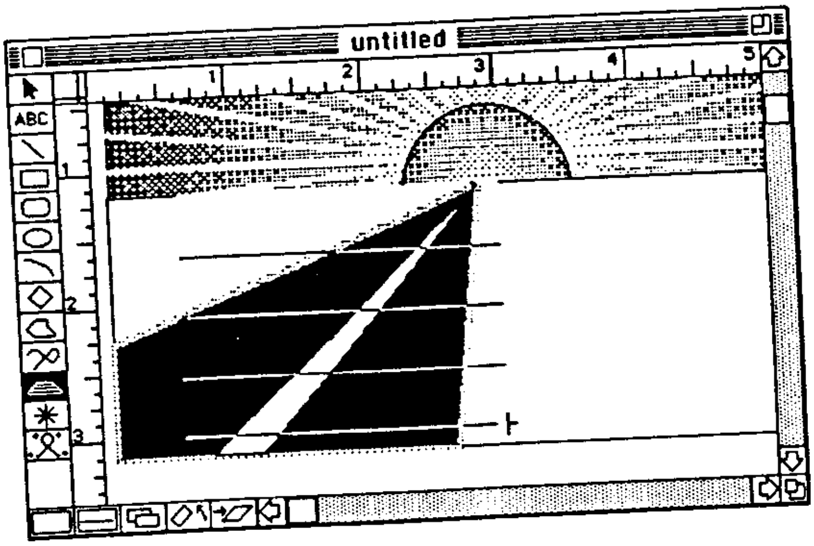
- *Click the* ***Create*** *button.*

The cursor changes to a paintbrush.

Note: Object modifications like fountains affect the currently selected object(s). Objects remain selected directly after their creation. Objects can be selected by clicking on them with the arrow cursor or by dragging the cursor across the items. This is the same proceedure used to select icons in the Finder.

- *Select* ***Edit Polygon*** *from the* ***Edit*** *menu.*

- *Reposition the vertices of the polygon until you are happy with the perspective.*



- *Select the grate tool (just above the starburst tool) and draw a grate as wide and high as the polygon that we just drew.*

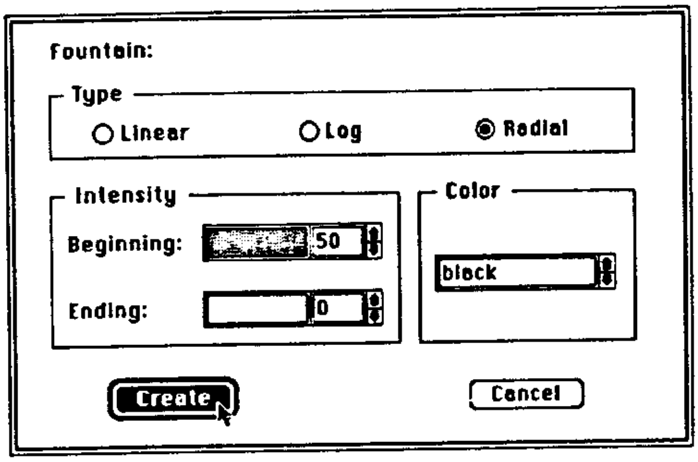
The grate overlayed on the polygon white polygon creates the effect of segmented stripes.

- *Double-click on the grate.*

- *Position the cursor at the top-left corner of the drawing window.*

- *Draw a rectangle about 6 inches wide and 3 inches tall.*

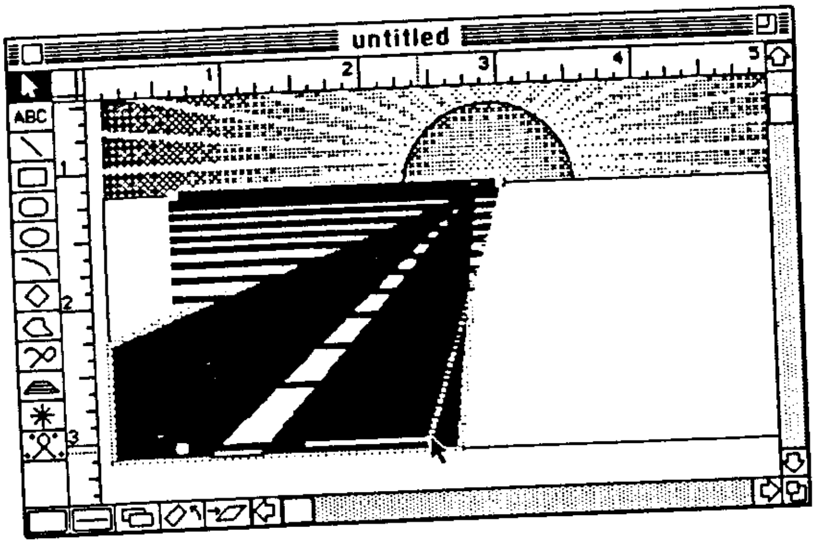
The rectangle is selected when you release the mouse button.



- *Select **Fountain** from the **Special** menu and create a radial fountain in the rectangle that was just created. Set the beginning intensity to 50 and the ending intensity to 0.*

- *Click the **Create** button.*

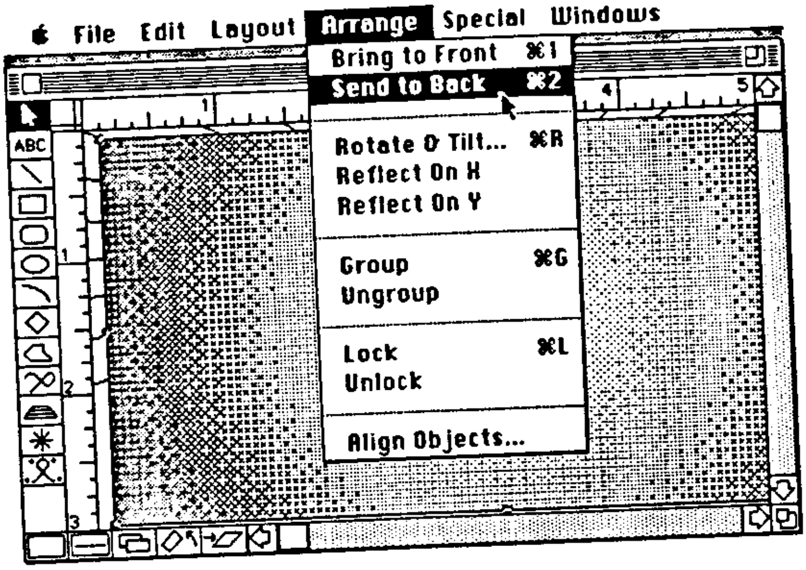
The grate causes the white line polygon to appear as a dashed line.



- *Select* ***Edit Grate*** *from the* ***Edit*** *menu.*

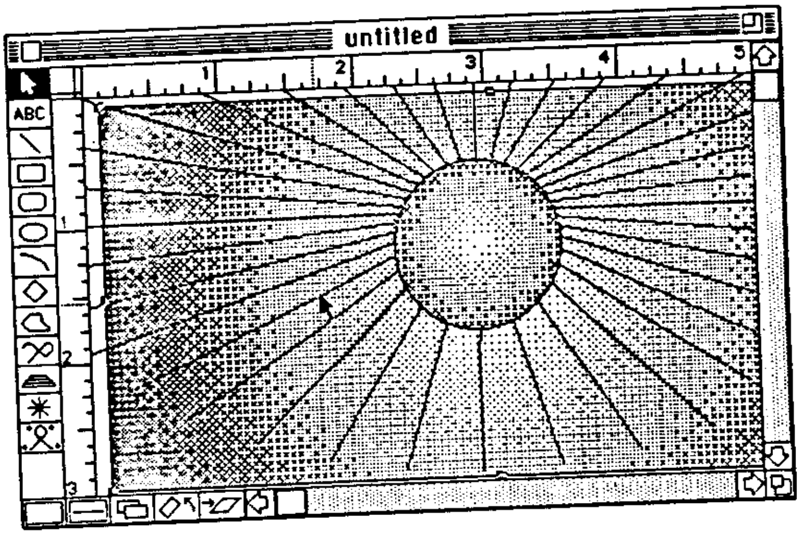
Handles appear at the four corners of the grate.

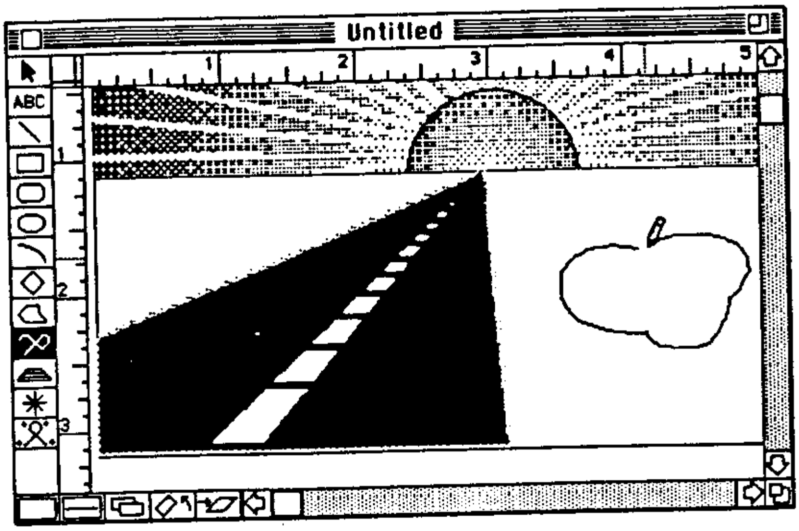
- *Position the handles (drag them) onto the surface of the road so that they are hidden in the road surface.*



- *Select **Send to Back** from the **Arrange** menu.*

The fountained rectangle, which remained selected from the previous operation, goes to the back of the drawing.

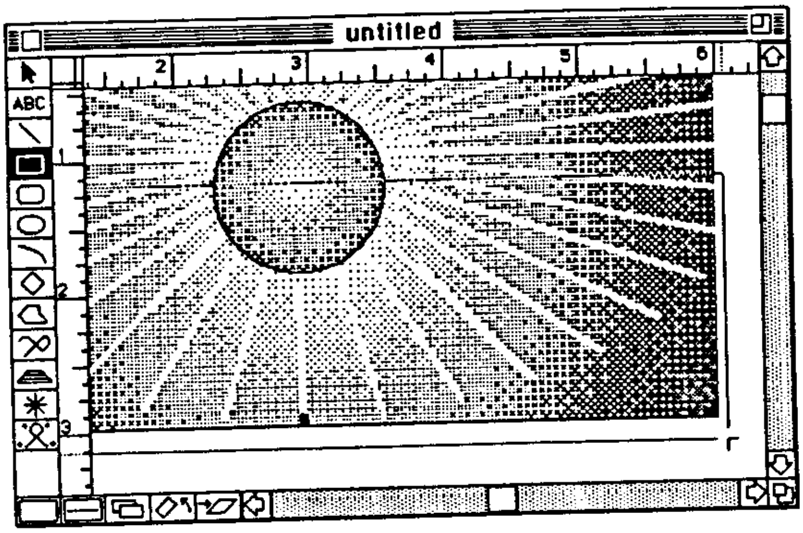




- *Select the freehand tool (just above the grate tool) from the tools palette and draw an irregular shaped object to represent a fluffy cloud.*

Make certain the endpoint of the freehand meets the beginning. If you double-click on the freehand, you can determine if the freehand closed. The dialog should be titled "Closed Freehand." If the dialog is titled "Open Freehand", you need to make another cloud. Simply select the cloud and press the **Backspace** key to remove it. Try again until you are satisfied with the cloud.

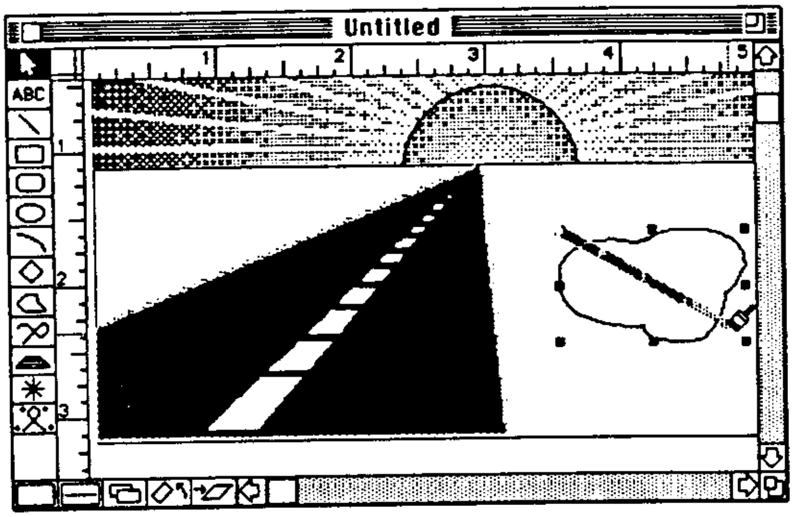
Note: An object must be closed to be filled, shadowed, or fountained. The endpoint must be exactly coincident with the starting point for freehand and polygon objects to become closed.



- *Select the rectangle tool and draw a rectangle about 2.5 inches tall and as wide as the rectangle which we fountained earlier.*

- *Use the scroll bars to return to the top left corner of the page.*

The new rectangle should partially cover the circle as shown in the next illustration. This rectangle now appears as a plane with its upper-edge simulating a horizon.



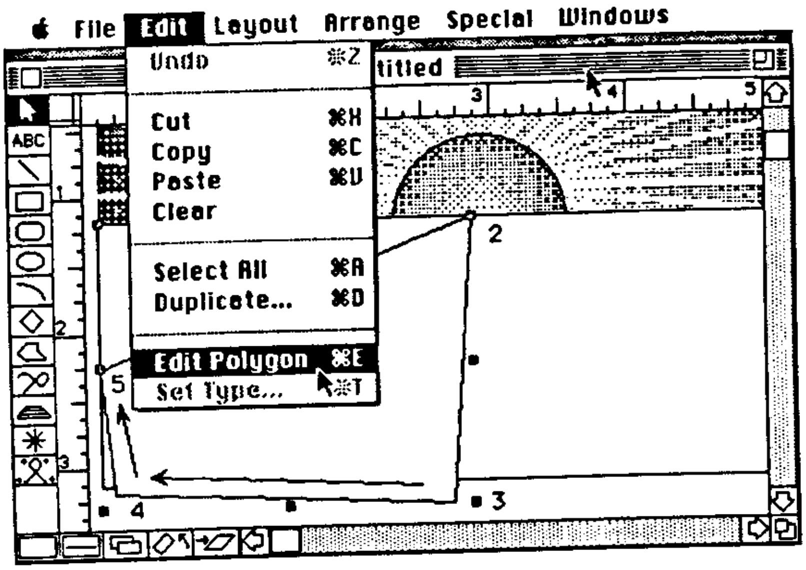
The cursor becomes a paintbrush.

- *Click on the top left corner of the cloud and drag towards the bottom right corner. Release the mouse button.*

The fountain flows along the path you just defined using the beginning and ending intensities specified in the fountain dialog box.

- *Create another vertex (#4) at the bottom left corner of the white rectangle by clicking there.*

- *Position the cursor directly on the starting vertex and click to close the polygon (#5).*

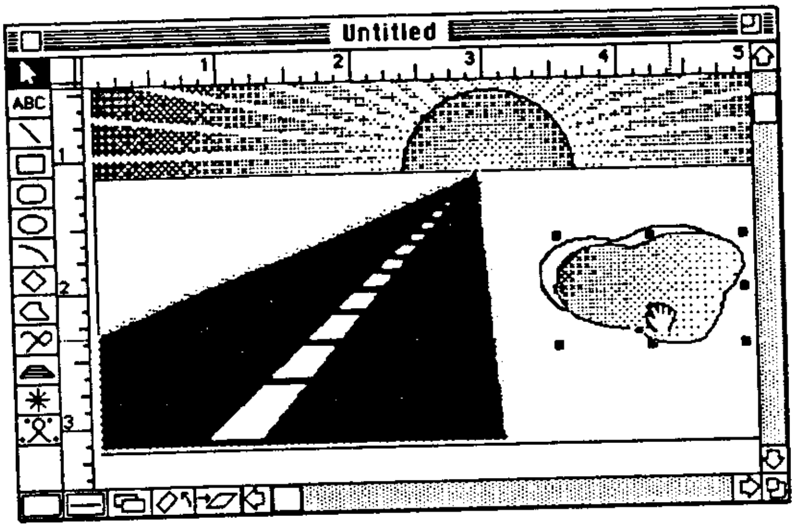


The polygon forms the road to the sunrise. The vertices can be repositioned if necessary by selecting the polygon (click on it), and selecting the **Edit Polygon** command in the **Edit** menu. Handles (small black blocks) appear at each of the vertices on the polygon. These can be repositioned by dragging to reshape the polygon.

- *Set the beginning intensity for the shadow to about 15 and the ending intensity and border intensity to 0.*

- *Click the* ***Create*** *button.*

The cursor becomes a shadowed hand.



- *Click and drag the mouse to the upper-left.*

Notice that an outline of the cloud appears from behind the cloud. This is the shadow's border.

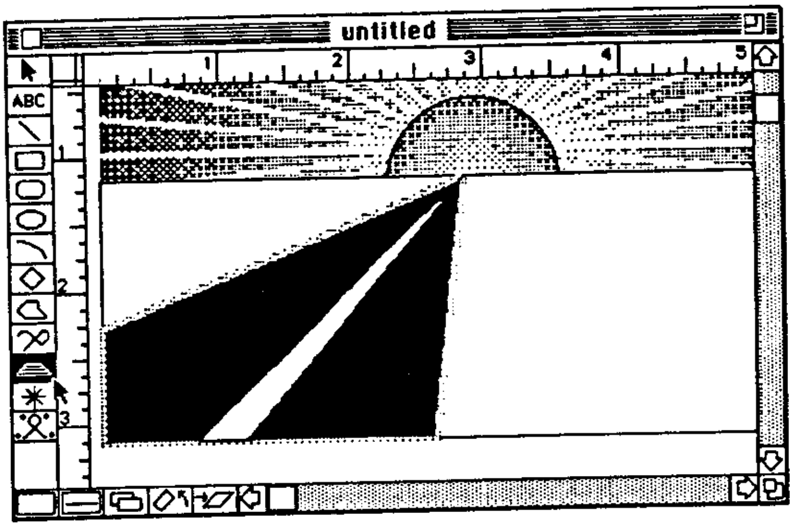
- *Release the mouse button.*

A shadow is drawn on the cloud with the beginning and ending intensities that you specified in the shadow dialog.

Note: If the dialog box is titled "Open Polygon", the starting and ending vertices were not coincident and you should click on the **Cancel** button. Delete the open polygon by clicking on it and pressing the **Backspace** key. Redraw the polygon, taking care to align the starting and ending vertices.

- *Set the fill intensity to 100 (black) Set the border line width to 3.00 and the border intensity to about 20.*

- *Click **OK**.*

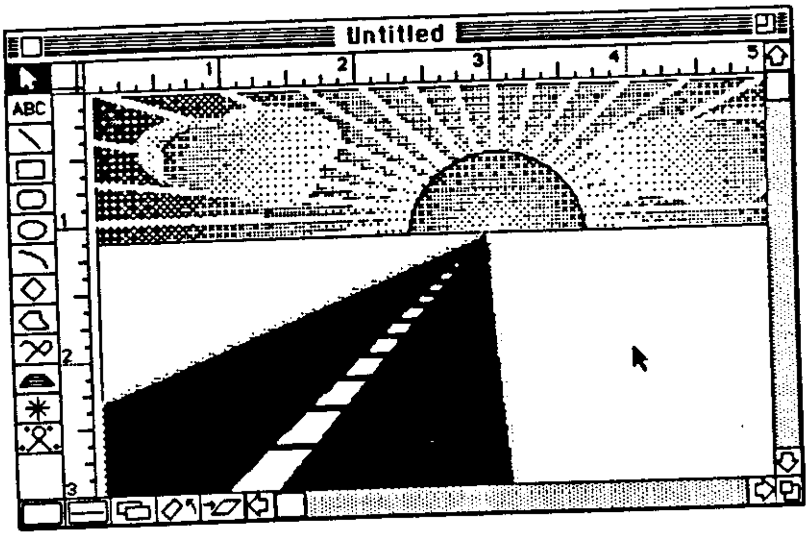


- *Draw another polygon, a thin triangle with the base at the bottom-left of the drawing, as shown in the illustration above.*

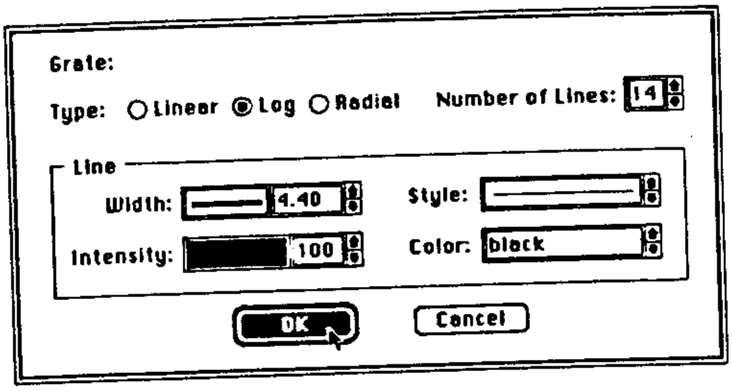
The purpose is to create the effect of a "passing stripe" (in perspective) disappearing down the center of the road into the sunrise. This polygon can also be edited, like the last one, to tweak its shape.

- *Set the line intensity to none (one step below 0) and click OK.*

This removes the black edge on the freehand to make the cloud appear softer.



If you like, you can draw another cloud. You can also duplicate the one you have already made by selecting the cloud and clicking on the **Duplicate** control at the bottom-left corner of the drawing window. The duplicate can then be repositioned in the sky.


Grate:

Type: ○ Linear ● Log ○ Radial Number of Lines: 14

Line

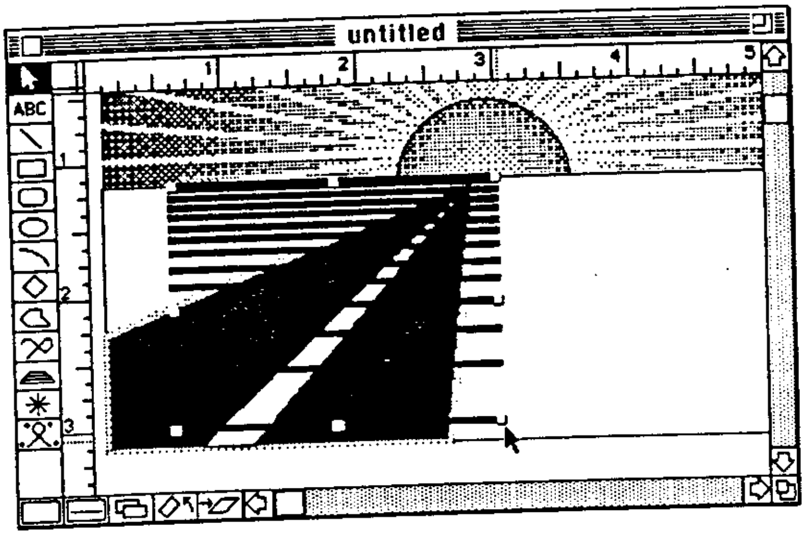
Width: 4.40 Style:

Intensity: 100 Color: black

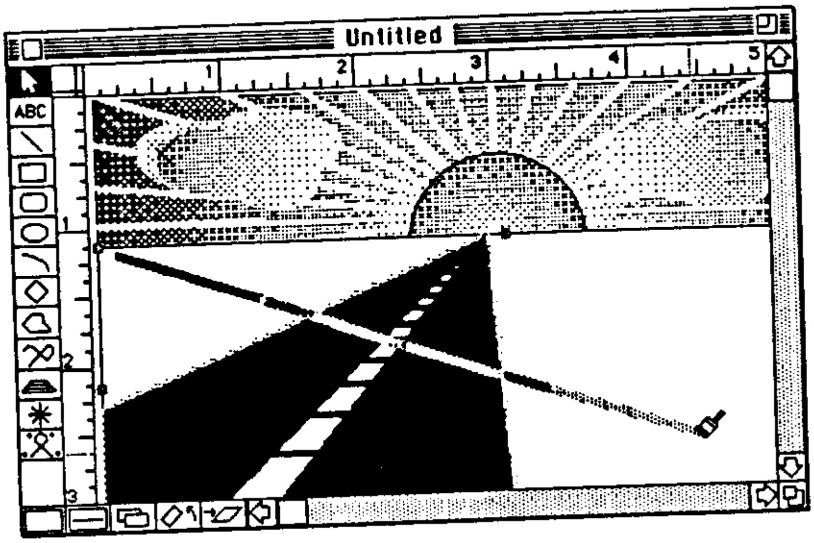
The grate attribute dialog appears.

- *Click the* ***Log*** *button. Increase the number of lines to 14 with the control for the number of lines and increase the line width to about 4.40.*

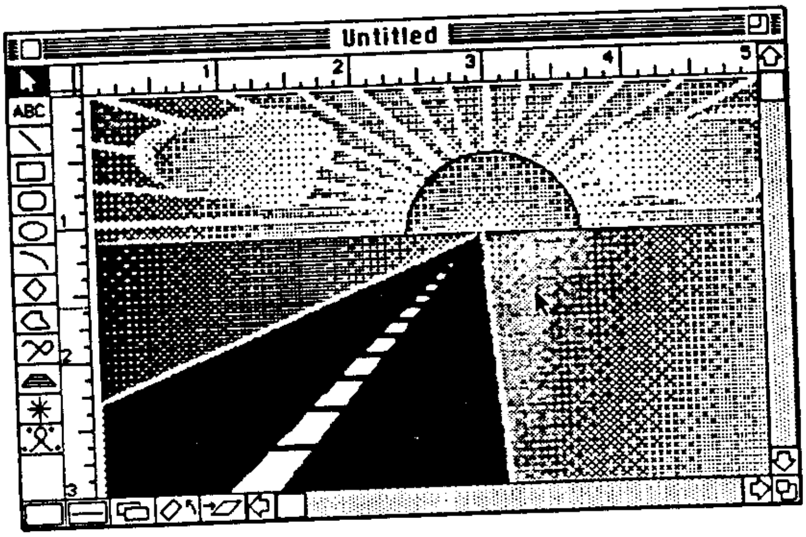
- *Click* ***OK****.*

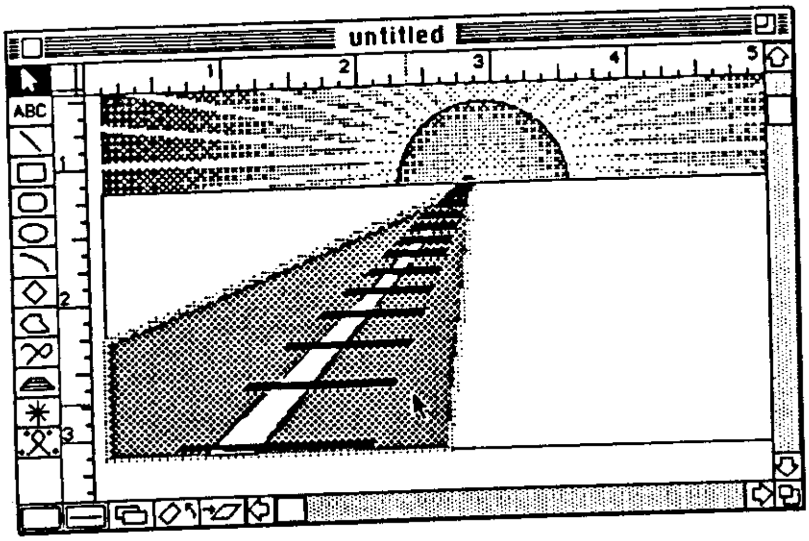


The cursor becomes a paintbrush.



- *Drag the paintbrush across the ground from upper-left to lower-right.*





- *Temporarily change the road surface gray intensity to a approximately 70 (by double-clicking the road and setting the appropriate control in the dialog that appears).*

Notice how the grate is located.

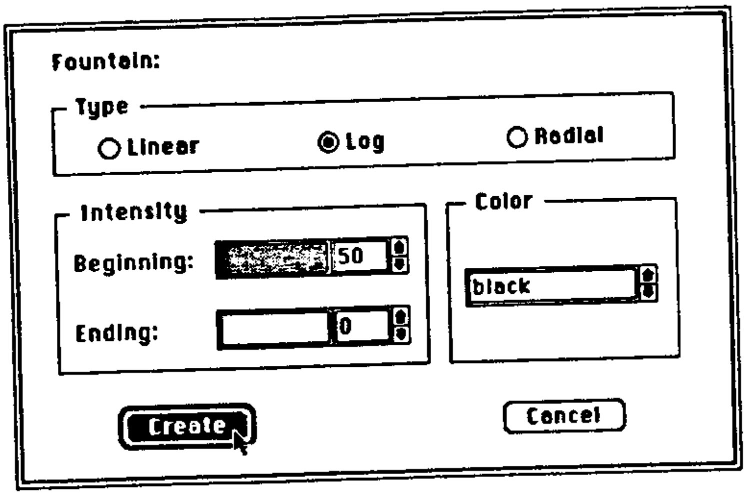
- *Reset the road surface back to black.*

The grate disappears once more into the road surface.

Chapter 2
The Drawing Window

In Cricket Draw, two types of windows are available - the Drawing window and the PostScript window. Most users may never use the PostScript window because most drawings can be created entirely by using the Drawing window. This and the next four chapters describe the Drawing window and its use. Details on the PostScript window can be found in Chapter 7.

The Drawing window is the "sketchpad" that you use to create your images. It contains the necessary tools to create such graphic objects as lines and rectangles, as well as many other useful objects. The window also contains a number of controls for changing line and fill characteristics, as well as controls for manipulating objects (such as rotations).



Fountain:

Type

○ Linear ● Log ○ Radial

Intensity

Beginning: 50

Ending: 0

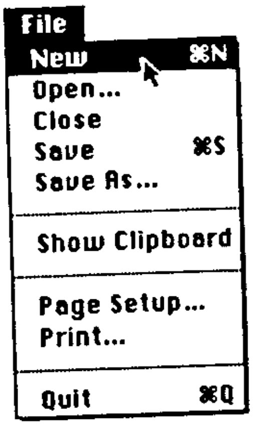
Color

black

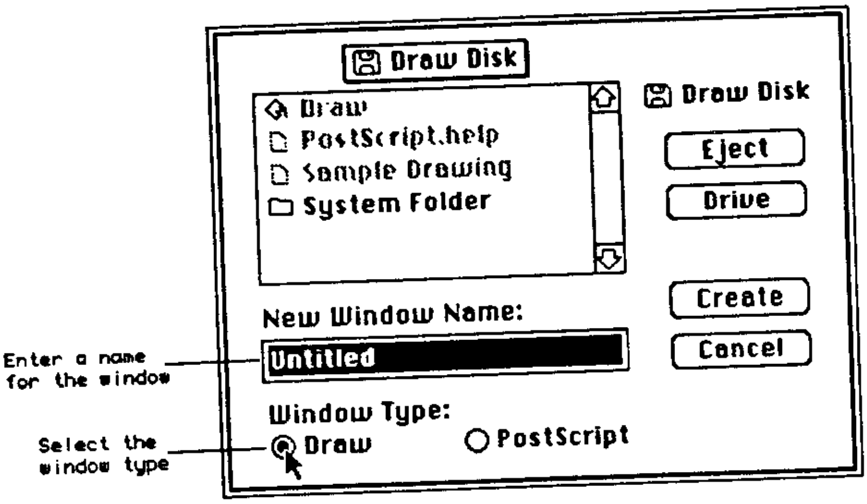
- *Select **Fountain** from the **Special** menu.*
- *Set the beginning intensity to 50 and the ending intensity to 0.*
- *Click on the **Log** button and then click the **Create** button.*

Creating a New Drawing Window

To create a Drawing window, select New from the File menu.



A dialog box appears allowing you to name the window and select the proper folder in which to place it.

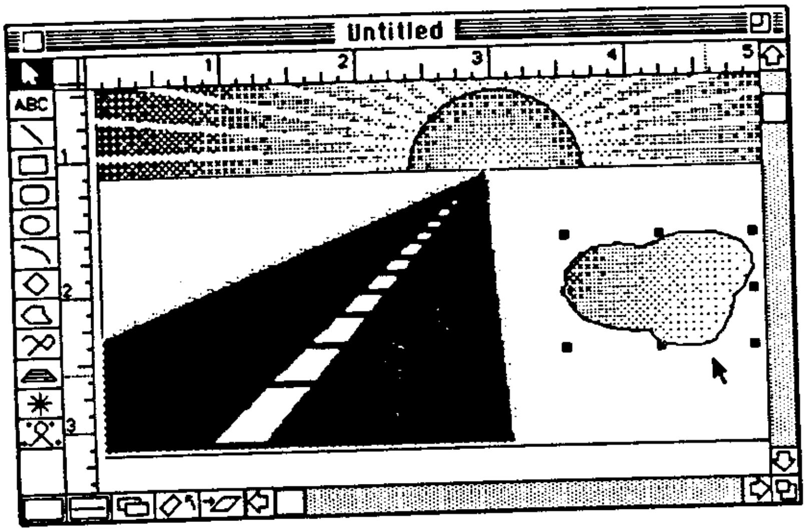


New Window Name: Untitled

Window Type: ● Draw ○ PostScript

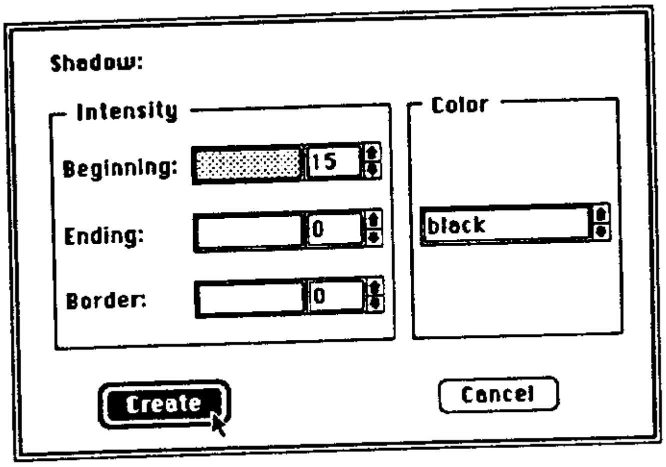
Enter a name for the window

Select the window type



- *Select the cloud by clicking on it*

- *Select* ***Shadow*** *from the* ***Special*** *menu.*


Shadow:

Intensity

Beginning: 15

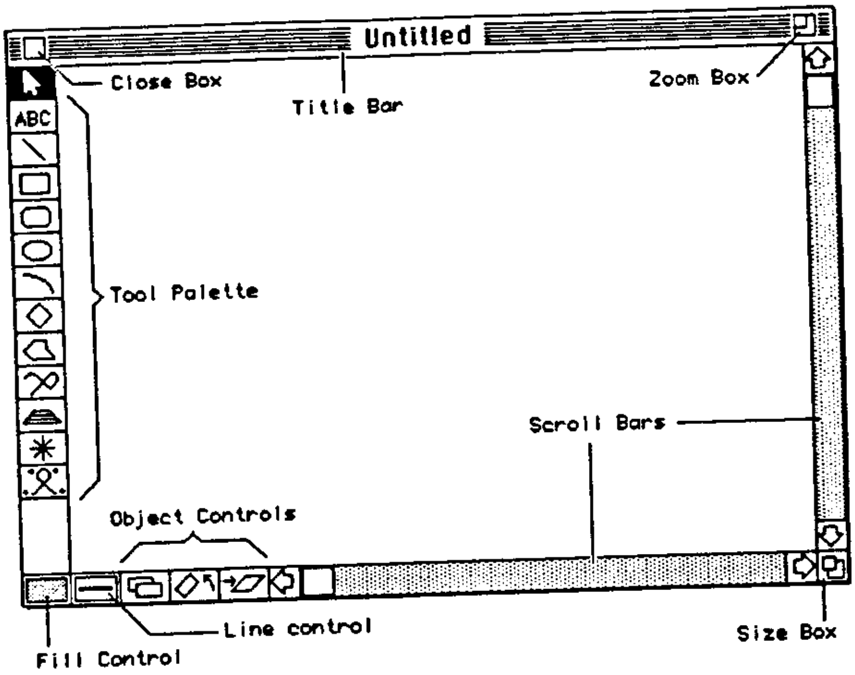
Ending: 0

Border: 0

Color

black

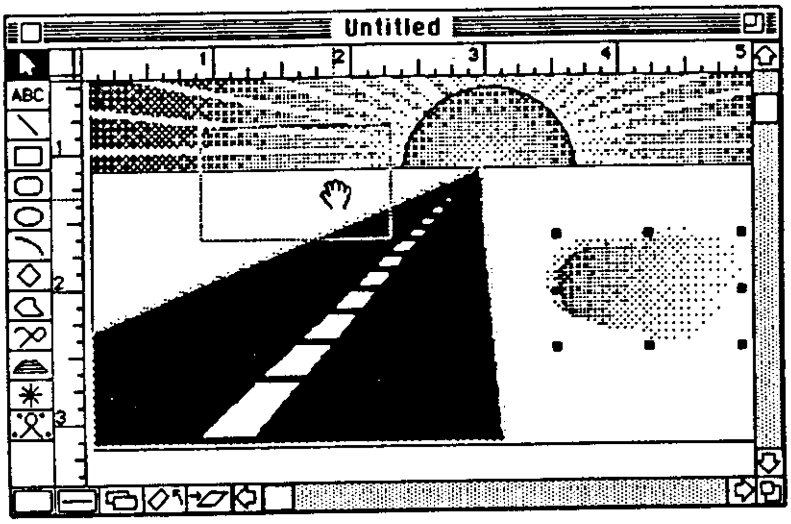
The shadow dialog appears.



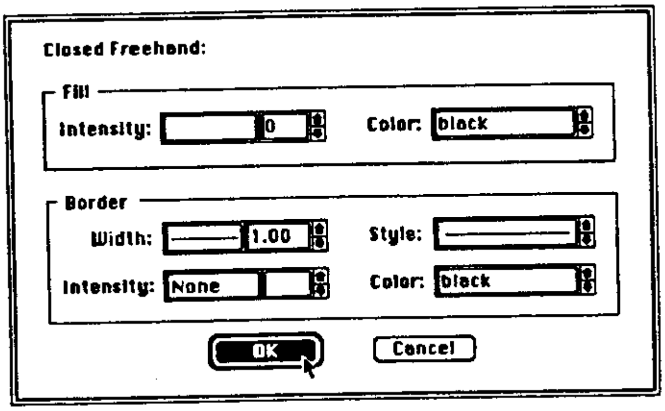
The Tools Palette

The drawing primitives available for your use are found in the palette on the left-hand edge of the drawing window. Most of these tools are straightforward, but others need explanation.

Chapter 3 explains the use of each primitive, except text. Because text is the most complicated object available in Cricket Draw, Chapter 5 is dedicated entirely to creating and manipulating text.



- *Drag the cloud into the sky.*


Closed Freehand:

Fill

Intensity: 0

Color: black

Border

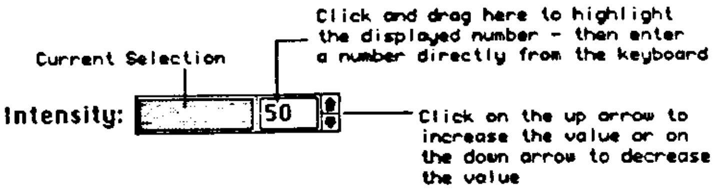
Width: 1.00

Intensity: None

Color: black

- *Double-click on the cloud.*

The freehand attributes dialog appears.



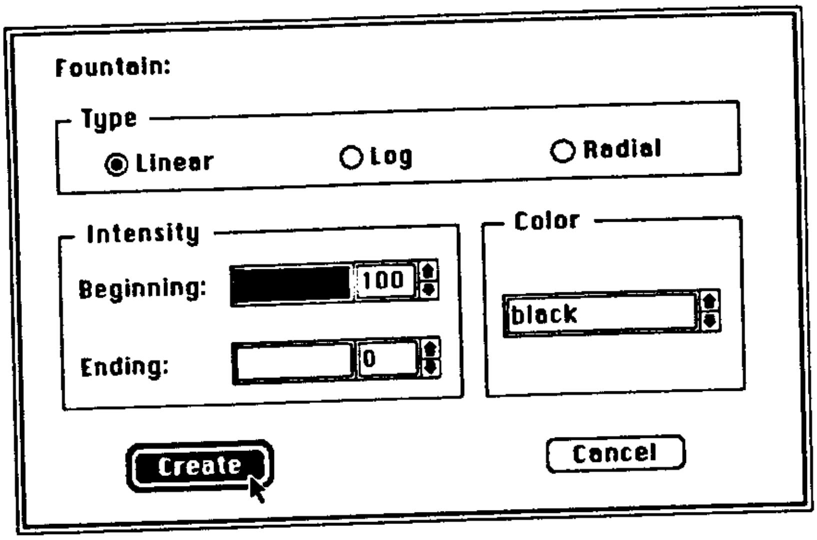
Current Selection

Click and drag here to highlight the displayed number - then enter a number directly from the keyboard

Click on the up arrow to increase the value or on the down arrow to decrease the value

Many controls in Cricket Draw allow you to set a numerical value, such as setting the gray scale intensity of an object. You can increase the current value by clicking on the up arrow in the control. Likewise, you can decrease the value by clicking in the down arrow.

On numerical controls, you can also enter a value directly by dragging the cursor across the number displayed. This highlights the number to indicate that it is selected. Typing a value from the keyboard replaces the selected value. A value can be entered more rapidly in this fashion than by using the arrows in the control.



Fountain:

Type

● Linear ○ Log ○ Radial

Intensity

Beginning: 100

Ending: 0

Color

black

The ground looks quite stark. Fountains slow the drawing process, with larger ones taking longer. Therefore, the ground is not fountained until the very last step.

- *Select the large white rectangle that forms the ground.*

- *Select* ***Fountain*** *from the* ***Special*** *menu and click the* ***Create*** *button.*

Intensity and Color

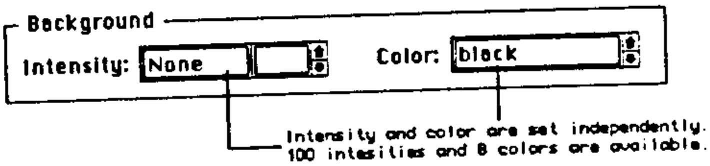
Cricket Draw is capable of generating PostScript which includes commands for printing in gray levels or color. Click on the **Black & White** button if you wish the PostScript generated from the drawing to implement gray scale commands. Likewise, if Cricket Draw is to generate PostScript with color commands, click on the **Color** button.

The eight colors that are available within Cricket Draw can be varied over a wide range of intensities. Therefore, intensity settings and color settings are affect one another when working in the PostScript color mode. If you selected the black and white PostScript mode, setting the color values has no affect. If printing on the ImageWriter II, the color settings are important.

PostScript-compatible printers currently are black and white devices. In the near future, color PostScript devices can be expected. In the meantime, the color capability is useful if you are creating drawings to be printed on the ImageWriter II equipped with a color ribbon.

Setting the Background

The background intensity and color for a drawing can be set from the Preferences dialog. Intensity varies from None to 100% with 100% being the most intense of whatever color you select.



Intensity: None
Color: black

Intensity and color are set independently.
100 intesilies and 8 colors are available.

In most cases, you probably wish to select None (one step below 0%) so that the color of the paper you are using serves as the background.

The ground fountains accordingly and the Sunrise Highway is complete!

- *Select Save from the* ***File*** *menu.*

A dialog appears allowing you to name the disk file in which the picture is going to be saved. After entering the name, click the Save button and the drawing is saved to disk.

- *If you have a printer connected to the Macintosh, select* ***Print*** *from the* ***File*** *menu.*

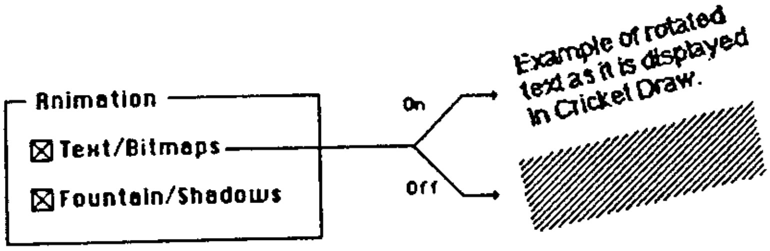
A dialog appears allowing you to specify a number of options. The options depend on the type of printer that is connected. After clicking the OK button, the drawing is printed.

Note: If you would like to take a peek at the PostScript program that is used to print this image, skip to Chapter 7 and follow the directions.

With a little practice and creativity, you can use the tools provided by Cricket Draw to create some spectacular effects. Various combinations of tools can create some bizarre patterns. Do not be afraid to experiment. Objects in the drawing can easily be modified or removed.

Animation

Rotated text and bitmaps can be displayed on screen but slow the drawing process somewhat. In the Preferences dialog box you can turn on or off the animation of rotated text or bitmaps.



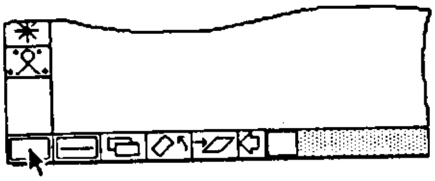
Animation

☒ Text/Bitmaps

☒ Fountain/Shadows

If you turn this option off, all rotated text or bitmaps appear as diagonal lines. This speeds things greatly. Either way, rotated text and bitmaps appear correctly on the printer.

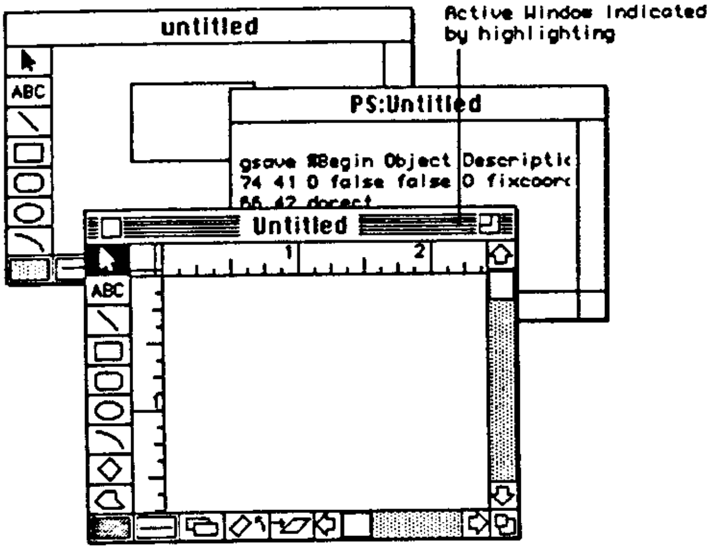
Changing Fill and Border



The first control at the bottom left of a Drawing window allows you to modify the current fill pattern. If you click in the fill control, you are presented with the following dialog.

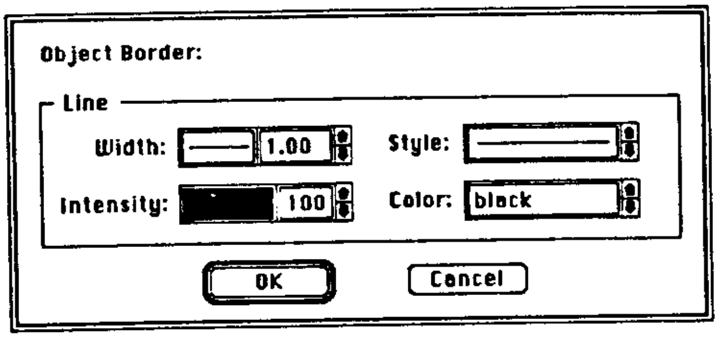
Available Menus

Whenever a Drawing window is active (the active window is the forward window, whose title bar is highlighted), its menu bar contains a variety of items that help you create and modify your drawings.


Active Window Indicated by highlighting

```
gsave %Begin Object Descriptio
74 41 0 false false 0 fixcoor
66 42 dorect
```

Each of the menu items available is discussed briefly in Appendix E. If you are the type of person who likes to jump into a program and explore, you can use Appendix E for assistance.



Object Border:

Line

Width: 1.00

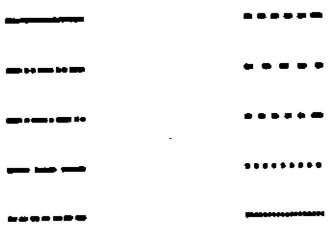
Style:

Intensity: 100

Color: black

You can select the gray and color value of the line by clicking on the appropriate gray or color (depending on what palette you have selected).

The line thickness control allows you to change the width of the pen used in drawing. Click on the arrow pointing up to increase line thickness, or on the arrow pointing down to decrease line thickness. Line thickness is displayed in the control and is constantly updated as you change it. The line displayed within this control is the screen approximation of a line drawn with the selected line thickness.



Object borders can be drawn with one of ten line styles

You can also change line styles by clicking on the arrows in the style control until the line style you wish to use is displayed. A word of warning though, line styles other than a solid line slow the display.

If you wish to place the drawing in a specific folder, select the folder by double-clicking on its name. Continue to double-click on folder names until you reach the folder you wish to save the drawing in.

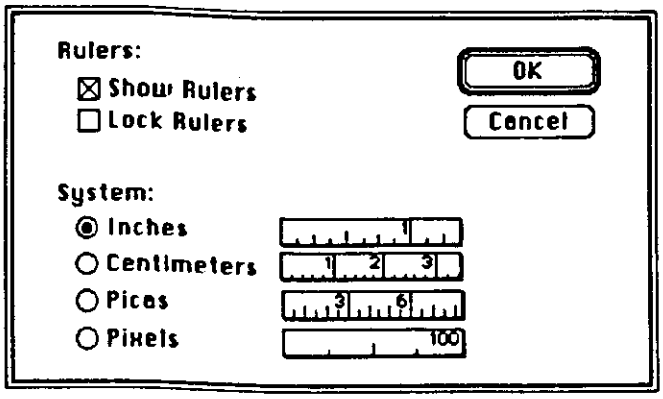
You can backtrack through the folders by clicking the small rectangular area at the top of the dialog box which lists the current folder's name. Hold the mouse button down and drag to the appropriate folder in the list of folder names that appear.

To switch drives, click the **Drive** button. Swap disks in the current drive by clicking the **Eject** button.

Enter a name for the drawing. This name appears at the top of the drawing window. Whenever you save the drawing, the name and folder that you selected is be used.

Notice that at the bottom of the dialog box you are given the choice of creating either a Draw window or a PostScript window. In this case, click the button labeled **Draw**.

After you have selected the appropriate options, click on the **Create** button and a new Drawing window is created.



Rulers:

☒ Show Rulers
☐ Lock Rulers

System:

● Inches
○ Centimeters
○ Picas
○ Pixels

A dialog box appears allowing you to select various options for rulers. The first check box allows you to turn the ruler display on and off. An "x" in the box indicates that the ruler display is on. Click on the box to turn the ruler display off.

The next check box allows you to lock the rulers. Locked rulers can not be modified. For example, you cannot change from inches to centimeters or reset the zero points while a ruler is locked. This feature is useful if you have made modifications to the ruler and do not wish to change them by accident.

A set of buttons allows you to choose one of four different types of ruler scales. Pixels are single dots on the Macintosh screen and represent 1/72 of an inch. Picas are often used by typesetters and a pica is equivalent to 12 pixels or 1/6 of an inch (12/72=1/6).

After selecting the type of ruler you wish to use and whether or not you want it to be displayed, click the **OK** button.

The Object Controls

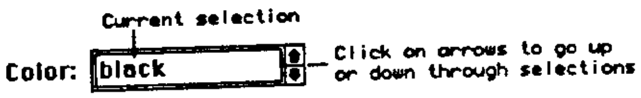
At the bottom of each drawing window are a number of controls which allow you to modify the drawing characteristics or manipulate one or more objects. Each of these controls is be explained in detail as they are encountered in this manual.

Scrolling Around

In most cases, your drawing is probably much bigger than the limited viewing area of the Macintosh screen. You can move about in the drawing area by using the horizontal and vertical scroll bars. Operating these scroll bars is exactly the same as in any other Macintosh application.

Controls Unique to Cricket Draw

Many values can be set in Cricket Draw by using a control. Some controls allow setting numerical values, such as gray scale or line width. Other controls allow you to select between several options, such as line style or colors.

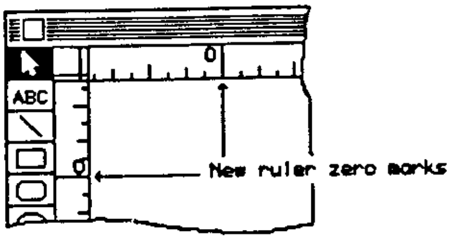


Color: black

When presented with several options, you can select your choice by clicking in the up or down arrow to cycle through the choices. Whatever choice is displayed, is the choice that is used to draw the object. The color selection control is an example of this kind of control.

moving the cursor into the drawing area (this is referred to as "dragging").

Two dotted lines follow the cursor movement. The intersection of the two dotted lines represents the zero point of the rulers.

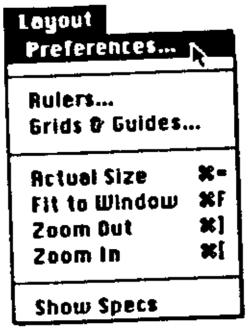


When you release the mouse button, the zero point of each ruler is moved to the point where the two dotted lines intersect. It is a good idea to select **Rulers** again from the **Layout** menu and lock the rulers, to prevent accidental changes to the zero points just set.

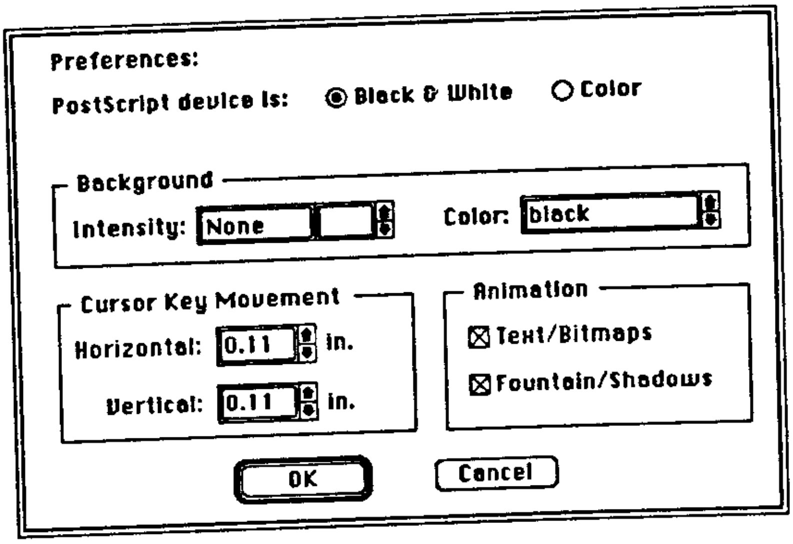
To return the ruler zero points to the original upper left-hand position in the drawing, click once in the upper left-hand box just as if you were going to reset the ruler zero marks. The ruler zero points return to the upper left-hand edge of the drawing area.

Specify Your Preferences

A number of options, pertaining to the drawing environment, can be set by you.



Select **Preferences** from the **Layout** menu and the following dialog appears.


Preferences:

PostScript device is: ● Black & White ○ Color

Background

Intensity: None

Color: black

Cursor Key Movement

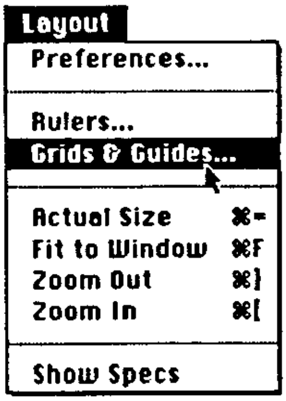
Horizontal: 0.11 in.

Vertical: 0.11 in.

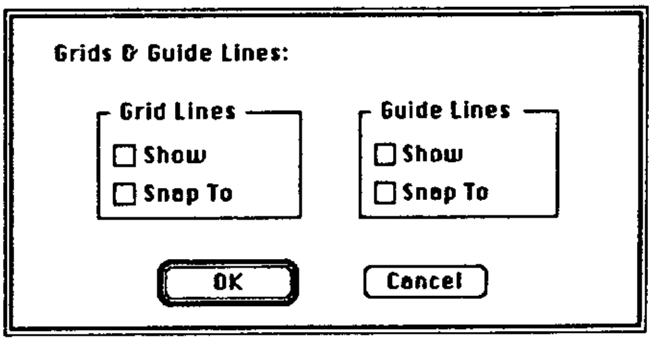
Animation

☒ Text/Bitmaps

☒ Fountain/Shadows



Select **Grids & Guides** from the **Layout** menu.

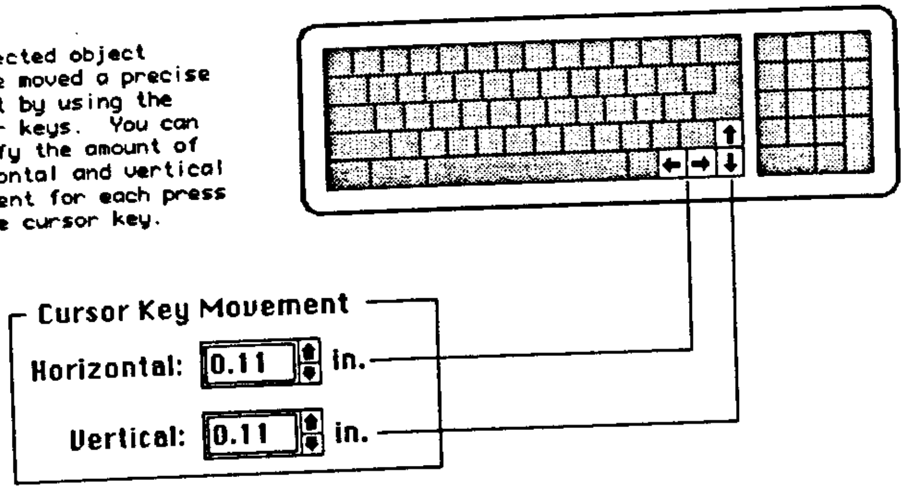


A dialog box appears. The check boxes on the left pertain to grid lines, while the check boxes on the right pertain to guide lines.

Click on the **Show** check box to turn the grid lines or guide lines on or off. An "x" in the box indicates that they are on. Clicking on the "x" turns it off.

Cursor Controls

The cursor keys can be used to move selected objects a precise number of pixels on screen.



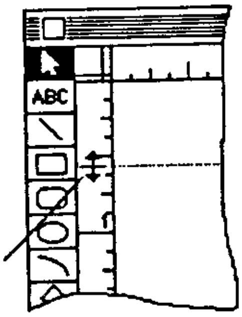
A selected object can be moved a precise amount by using the cursor keys. You can specify the amount of horizontal and vertical movement for each press of the cursor key.

Cursor Key Movement

Horizontal: 0.11 in.

Vertical: 0.11 in.

You can specify the number of pixels of movement associated with each of the four cursor keys by setting the appropriate number in the control.

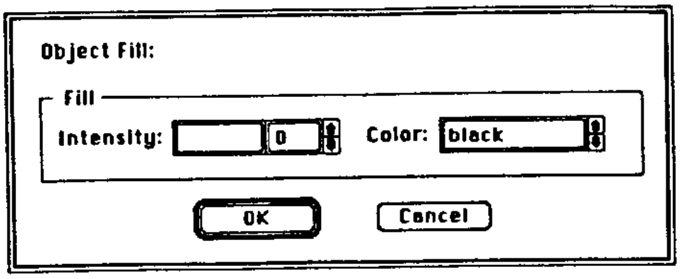


By placing the cursor over a guide line in a ruler, the guide line can be moved.

When the cursor is over a guide line and in a ruler, it changes to a bar with arrows pointing in two directions. This indicates that you can move the guide line in the directions indicated by the arrows if you click and drag.

To remove a guide line, click on the guide line in the ruler area, as if you were going to move it, and drag into the appropriate ruler. The guide line disappears.

Vertical guide lines can be placed and removed in the same way, by dragging from the vertical ruler. The number of horizontal and vertical guide lines is unlimited (depends on memory, of course!).



Object Fill:

Fill

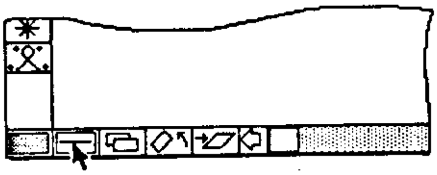
Intensity: 0

Color: black

You can select the proper fill by changing the appropriate control. Select from 100 intensities of one of eight colors. The current fill is displayed in this control.

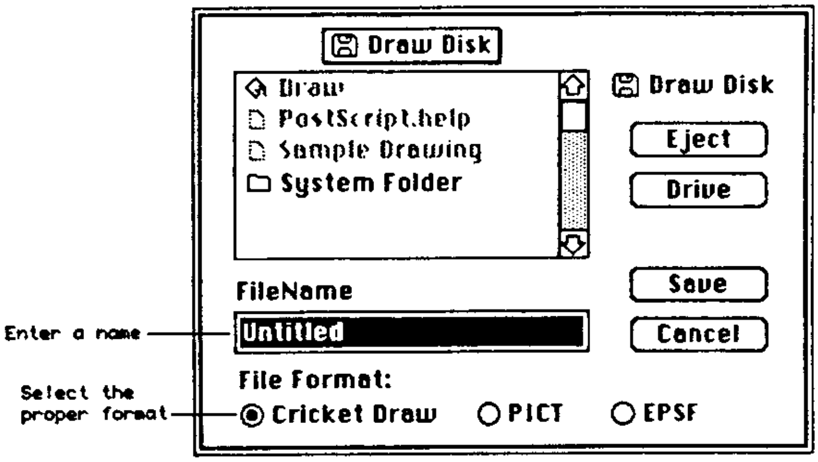
If you click on this control and change the fill while one or more objects are selected (selecting objects is discussed at the beginning of Chapter 4), the fill of the selected objects reflects the change.

By clicking in the line control, the second control at the bottom of a drawing window, you can change the characteristics of lines before drawing an object.



A dialog appears after you click in this control.

If you already assigned a name when you created the drawing window, the drawing is saved without further input from you. If, on the other hand, the window containing the drawing is untitled, the following dialog appears.



Draw Disk

Draw
PostScript.help
Sample Drawing
System Folder

FileName: Untitled

File Format:
● Cricket Draw ○ PICT ○ EPSF

Enter a name

Select the proper format

You can save the drawing under the name you choose, and also select the proper folder in which to place it. You can also select either **Cricket** format, **PICT** format, or **EPSF** format..

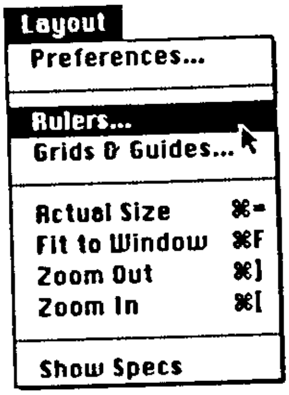
The Cricket format is more compact but can only be read by Cricket Draw. You may select this format if you wish to save disk space or reduce the size of the file for transmission over a modem.

The PICT format has many advantages when dealing with other applications. Many applications, such as Aldus PageMaker™ & MacDraw™, can read this file format. The PICT format is somewhat of a Macintosh standard for graphics. In fact, graphic images in the Clipboard are always stored in PICT format.

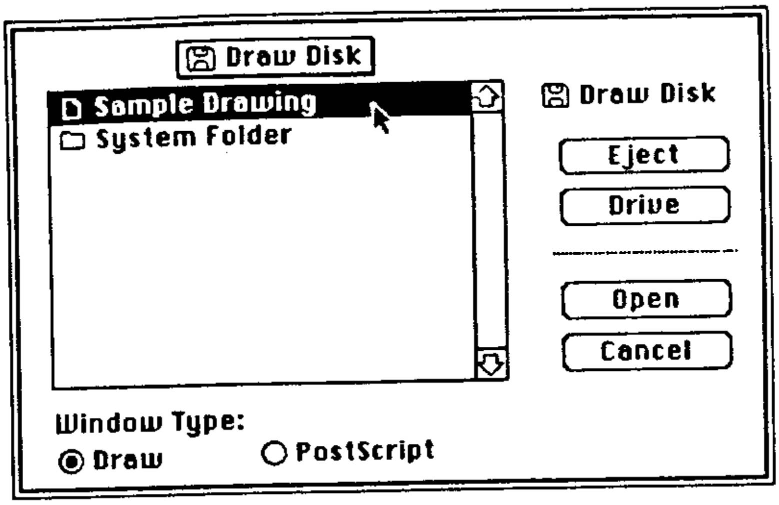
After you have selected the appropriate line options, click the **OK** button. The current line characteristics are displayed in the line control at the bottom of the Drawing window.

If you click on this control and change the line characteristics while one or more objects are selected, the lines used in drawing the selected objects also reflects the new changes.

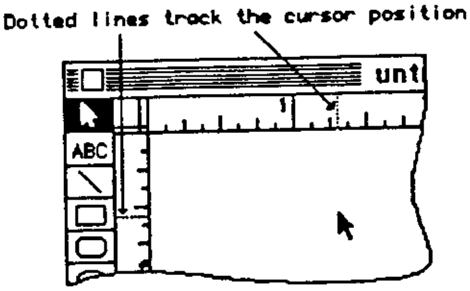
Setting up Rulers



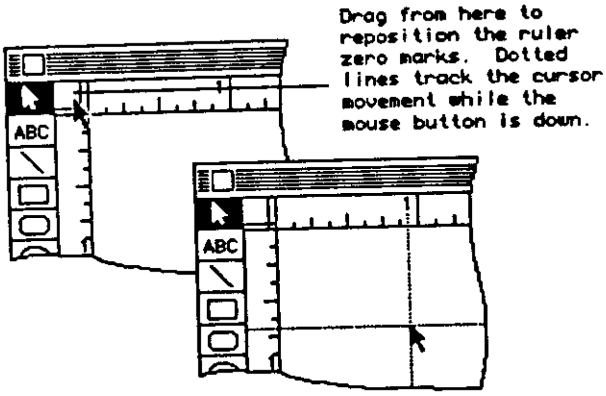
To assist you in sizing and placing objects in the drawing, you have a choice of rulers. Select **Rulers** from the **Layout** menu.



First, click the folder in which the drawing is located. The files listed are in one of three formats: MacDraw format, Cricket Draw format, or PICT format. Cricket Draw can read all three file types. Double-click on the name of the drawing you wish to open (Double-clicking is a shortcut for clicking on a name and then clicking the **Open** button).



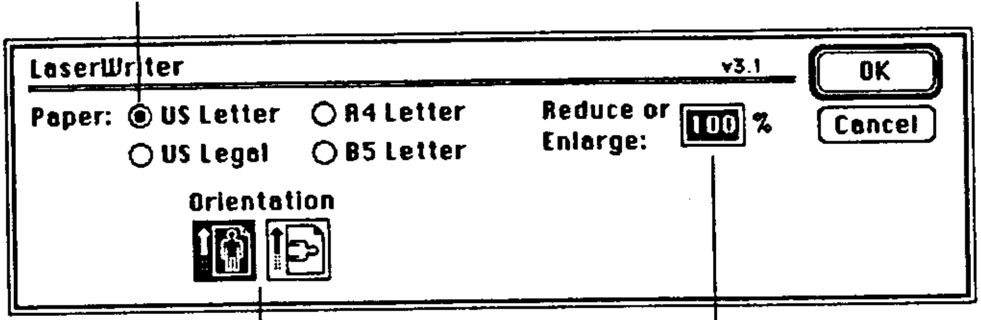
The rulers, when displayed, appear across the top and left edges of the Drawing window. For precise positioning of the cursor, notice how it is tracked in each of the rulers by a dotted line. By observing these dotted lines, you can place the cursor at an exact position on the page. The scales increase horizontally from left to right and vertically from top to bottom.



Drag from here to reposition the ruler zero marks. Dotted lines track the cursor movement while the mouse button is down.
ABC
ABC

The zero point of both rulers is set at the top left-hand corner of the drawing area. However, the position of the zero point in relation to the drawing area can easily be changed. Click in the upper left-hand box where the two rulers intersect and hold the mouse button down while

Be sure to select the proper paper size



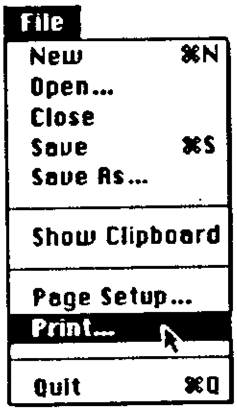
Paper: ● US Letter ○ A4 Letter
○ US Legal ○ B5 Letter

Reduce or Enlarge: 100 %

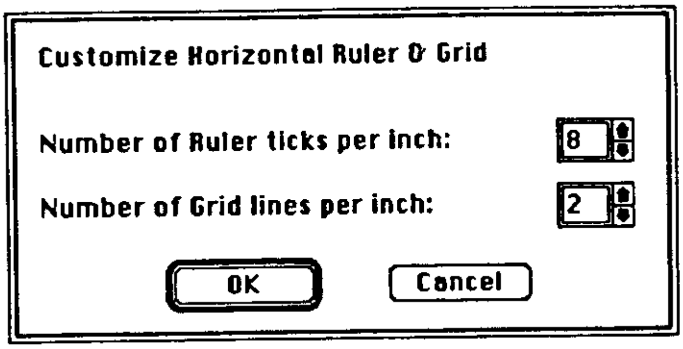
The orientation of the drawing on the page is selected here

A reduction or enlargement factor can be entered here

In the dialog that appears, you can select the orientation of the drawing on the page as well as the page size. You can also specify a reduction or enlargement factor for printing in this dialog.



Select **Print** from the **File** menu and a dialog appears.



Customize Horizontal Ruler & Grid

Number of Ruler ticks per inch: 8

Number of Grid lines per inch: 2

You can customize either ruler by double-clicking on the ruler. A dialog appears allowing you to select from several variations of spacing for the ruler marks and grid lines.

Using Grid Lines and Guide Lines

As aids in positioning objects in the drawing, you can use grids or guide lines.

Grids are a series of intersecting horizontal and vertical dotted lines. The distance between each of the grid lines is a function of the currently selected ruler.

Guide lines are dotted lines that you can position anywhere along the ruler. They can be used to help align objects and then disposed.

Chapter 3
The Drawing Tools

This chapter deals mainly with drawing different objects. Editing and modifying objects is dealt with in the next chapter.

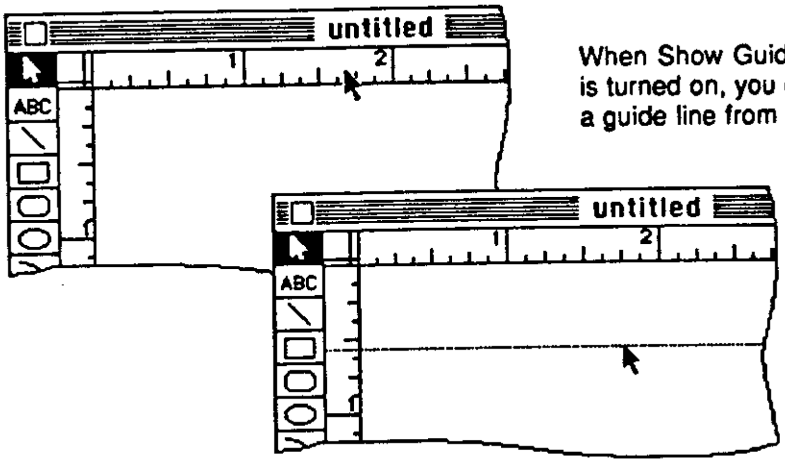
Cricket Draw provides you with a basic set of 12 tools...

- Text ABC
- Lines
- Rectangles & Squares
- Rounded Rectangles
- Ovals & Circles
- Arcs
- Diamonds
- Polygons
- Freehand Lines
- Grates
- Starbursts
- Bezier Curves

Each of these tools allows you to create an object. The word "object" is used a lot in this manual and it is important that you realize why the term is so significant.

An object is an independent item which has characteristics that can be changed with ease. Objects are device-independent, since their shapes are described mathematically rather than simply painted as they are sent to a particular device. The characteristics of each object can be changed (e.g., fill, border, position, and rotation). The resolution of the device you wish to print on does not matter.

You can also turn on or off the **Snap To** feature. Dragging an object with **Snap To** on for grid lines causes the object to snap to the nearest grid while the object is being positioned or sized. This is extremely useful when you want to be certain of exact positioning when printing on a device whose resolution is better than the Macintosh screen. The disadvantage is that precise screen positioning may be difficult and grid lines may not be present exactly where you wish to position the object. In that case, creating guide lines and setting **Snap To** for those guide lines may be more appropriate.



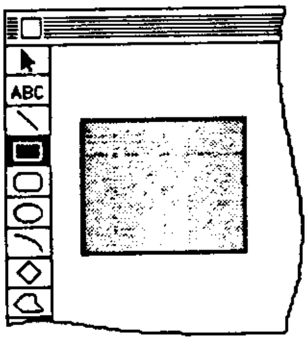
When Show Guide Lines is turned on, you can drag a guide line from a ruler

To set a horizontal guide line, click in the horizontal ruler at the top of the drawing window and drag the cursor into the drawing area (make sure that the **Show** guide lines option is turned on). A horizontal line follows the movement of the cursor.

Drag this line to the exact position on the drawing area where a guide line is to be placed. Notice how you can use the ruler to help determine the positioning. After you release the mouse button, the guide line remains at its current position.

Rectangles

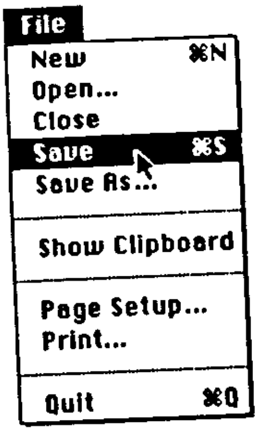
To define a rectangle or square, first click on the rectangle tool in the palette. Then click on a point in the drawing area where you wish one corner of the rectangle to be. Without releasing the mouse button, drag the cursor to another location to define a second point. An outline of a rectangle follows the movement of the cursor until you release the mouse button. The rectangle is then drawn using the two points as diagonal corners of the rectangle. The current fill and border are used in drawing the rectangle



Pressing down the **Shift** key while dragging the mouse, constrains the rectangle to a square.

Saving a Drawing

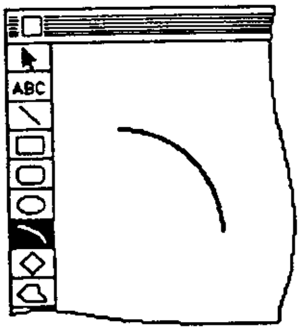
After creating a drawing, you can save it for recall at a later date.



With the drawing that you wish to save in the active window (the forward window - indicated by highlighting in the window title bar), select Save from the **File** menu.

Arcs

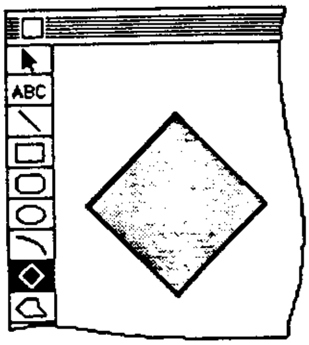
Defining an arc is similar to drawing an oval or rectangle.



Holding down the **Shift** key while defining the arc causes the arc to be constrained to a circular segment.

Diamonds

To define a diamond, click on the diamond tool and drag as if you were defining a rectangle.



Holding the **Shift** key while defining the diamond causes the sides of the diamond to be constrained to equal lengths.

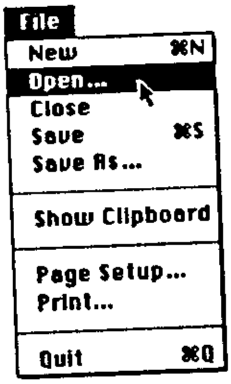
The EPSF format is a relatively new format used by few Macintosh programs at present. Several Macintosh applications are planning on allowing EPSF formatted files to be imported.

Appendix B describes each of the three file formats in more detail.

Selecting **Save As** from the **File** menu makes the above dialog appear even if the window has already been given a name. In this way you can save a given drawing under different names, in different folders or in different formats.

Recalling a Drawing

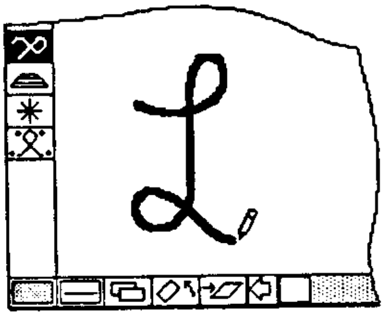
Drawings that have been saved previously can be recalled at any time.



Select **Open** from the **File** menu to recall a drawing from disk.

Freehand Lines

The procedure for creating freehand lines is similar to that in MacPaint™.

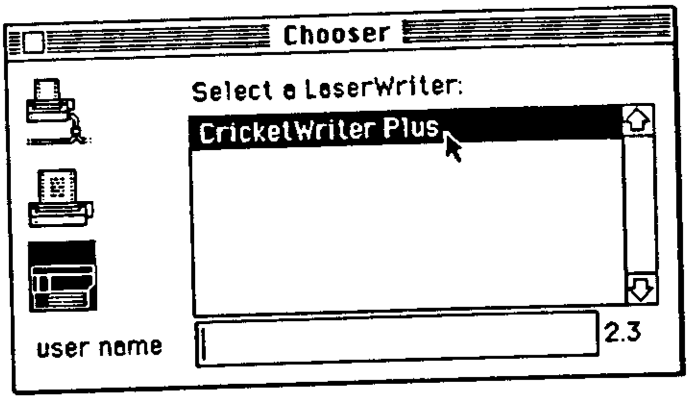


After you click on the freehand tool, the cursor turns into a pencil (indicative of what you can actually do). Any movement of the mouse while holding down the mouse button is traced on the screen, just as if you were drawing a pencil.

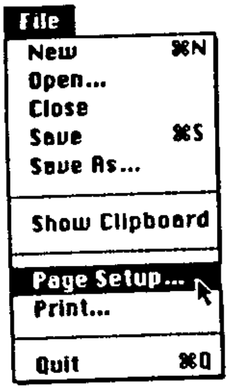
If the last point in the freehand line meets the first point, the freehand line is treated as a "closed" object which can be filled

Printing a Drawing

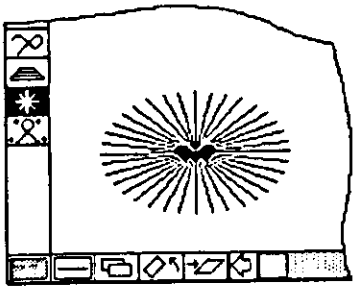
To print a drawing it is important to make sure that the proper printer is selected. Use the **Chooser** desk accessory to select a printer. (Refer to your Macintosh Owner's Guide if necessary.)



Assuming the selected printer is a LaserWriter, you can prepare for printing by doing the following.



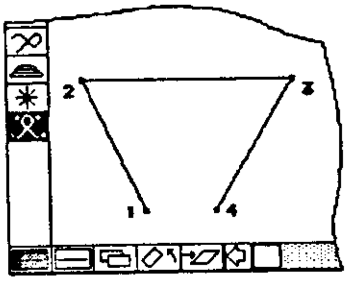
Select **Page Setup** from the **File** menu.



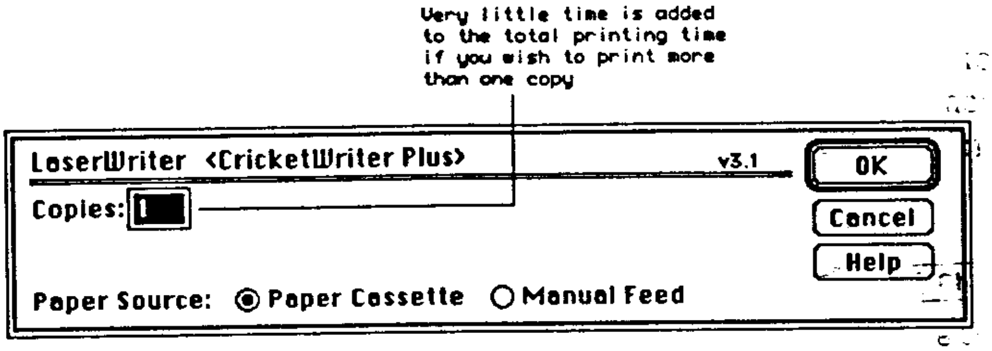
Holding down the **Shift** key constrains the starburst to a circle.

Bezier Curves

Bezier curves are the equivalent of an "electronic French curve". By defining four points (referred to as control points), a smooth continuous curve is created on the drawing.



After clicking on the Bezier tool, click on the drawing for each of the four control points.


Very little time is added to the total printing time if you wish to print more than one copy

LaserWriter <CricketWriter Plus> v3.1

Copies: 1

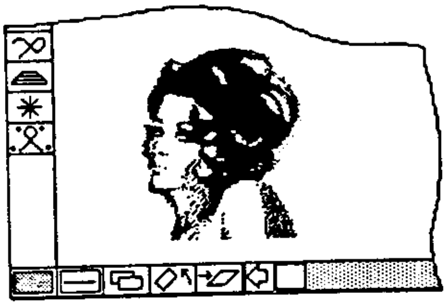
Paper Source: ● Paper Cassette ○ Manual Feed

Enter the the desired number of copies. On a PostScript printer, the initial imaging of a drawing takes up the greatest amount of total printing time. Once that imaging is completed, multiple copies are printed rapidly.

The length of time required to image and print a drawing depends on the complexity of the image and the printer that you are using. Most images take between 2-10 minutes.

Bitmaps

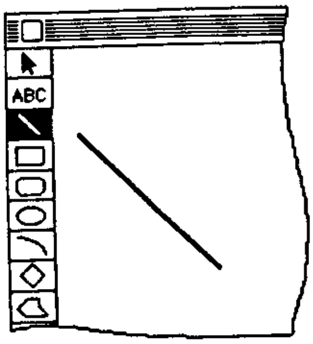
A bitmap is not a tool in the palette, but it is a legitimate object. Bitmaps cannot be created in Cricket Draw, but can be pasted in from the Clipboard. Once placed, you can then move and crop the bitmap.



If a bitmap is currently on the Clipboard, select **Paste** from the **Edit** menu and the bitmap is placed in the drawing. You can reposition the bitmap by dragging. The bitmap can also be cropped (trimmed at the edges), as explained in the next chapter.

Lines

The most basic drawing primitive is the line. To draw a line, click on the line tool in the palette and then click on the drawing area where you wish one end of the line.



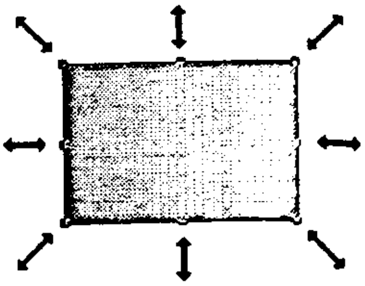
Hold down the mouse button and drag the cursor about the drawing area. The line follows the cursor movements until you release the mouse button. The place where you release the mouse button determines the other end of the line. The line is drawn using the current line thickness, intensity, and color.

Holding down the **Shift** key while defining the line restricts the line to being horizontal or vertical.

Chapter 4
Editing Objects

One of the greatest features of an object-oriented drawing program versus a bit-oriented program (e.g., MacPaint) is that it is much easier to make modifications and enhancements to a drawing. Drawings can be manipulated and rearranged because they are made up of individual objects with changeable attributes.

Before you can change an object's attributes, you must first select that object. To do so, simply click on it. Eight handles will appear about the object.

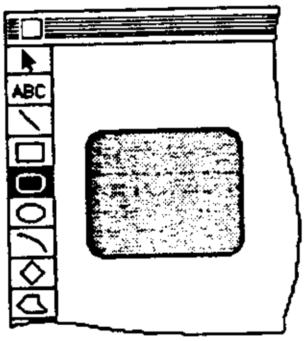


Eight handles appear about selected objects. The handles can be moved in the directions indicated to resize an object.

These handles are used as grabbing points for resizing the object. They also act as indicators that the object is selected. On irregularly shaped objects, such as ovals or polygons, the handles appear along an imaginary bounding rectangle.

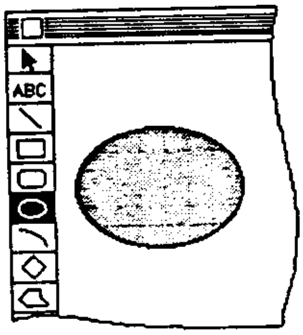
Rounded Rectangles

The same procedures apply for defining rounded rectangles as for normal rectangles.



Ovals

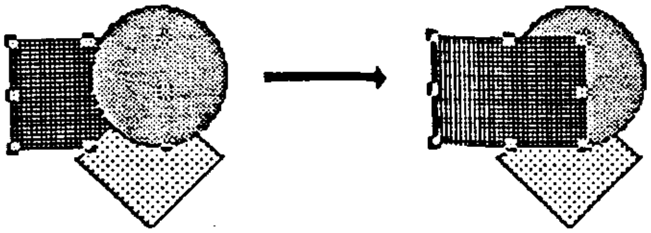
To define an oval or circle, click on the oval tool in the palette. The rest of the procedure is similar to the procedure for defining rectangles.



Holding down the **Shift** key while dragging the mouse constrains the oval to a circle.

Changing Stacking Order

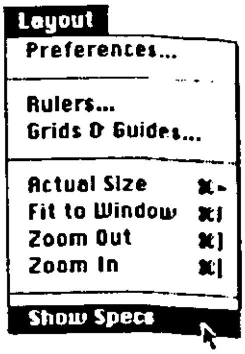
Complex images can be created using multiple layers of objects. The order in which the objects are drawn (called stacking order) is significant because objects in the back are hidden by objects in the front.



To change the stacking order of objects you must first select the object whose order you wish to change. Once an object is selected, you have two options: you can send that object to the very back or bring that object to the very front. These options are available in the **Arrange** menu. By careful selection of one of these two options, you can totally rearrange the order of all objects in a drawing.

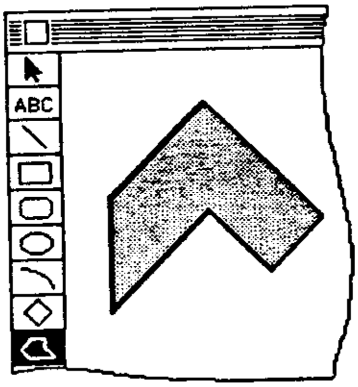
Precise Sizing

If you wish to draw an object with precise measurements, select **Show Specs** from the **Layout** menu.

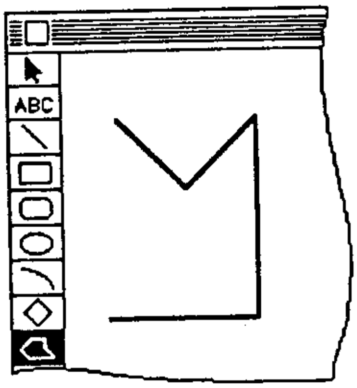


Polygons

Defining a polygon is much different than defining any of the previous objects. To define a polygon, first click on the polygon tool in the palette. Then go to a point on the drawing area where you wish to place a vertex of the polygon. Click at this point. A line follows all movements of the mouse. To define a second vertex of the polygon, click the mouse button with the cursor at the proper location on the drawing. Continue to do this for each of the vertices in the polygon.



Closed Polygon



Open Polygon

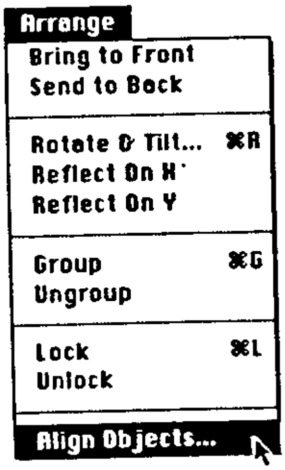
There are two different ways to finish off the polygon. Clicking on the beginning point of the polygon automatically closes the polygon and stops the definition procedure for the polygon. Using this method creates a "closed" polygon which can then be filled.

Another form of polygon is an "open" polygon, which is a series of connected lines but does not finish where it began. To create such a polygon, double-click after defining the last segment of the polygon. (The double-click indicates to the polygon definition routine that the last point is the end of the polygon.)

Aligning Objects

Many times you may wish to precisely align a number of objects. This is extremely important when you are printing on a very high-resolution device where 1/100 of an inch displacement can show.

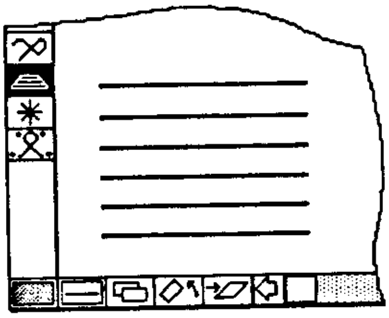
First select the objects that you wish to align. (Remember, to select more than one object, press down the **Shift** key while clicking on the objects.)



Select **Align Objects** from the **Arrange** menu.

Grates

Grates provide a convenient way to place a number of parallel lines in a drawing. Once the grate tool has been selected, defining a grate is done in exactly the same manner as defining a rectangle.



Holding down the **Shift** key while defining a grate constrains the grate to a square area.

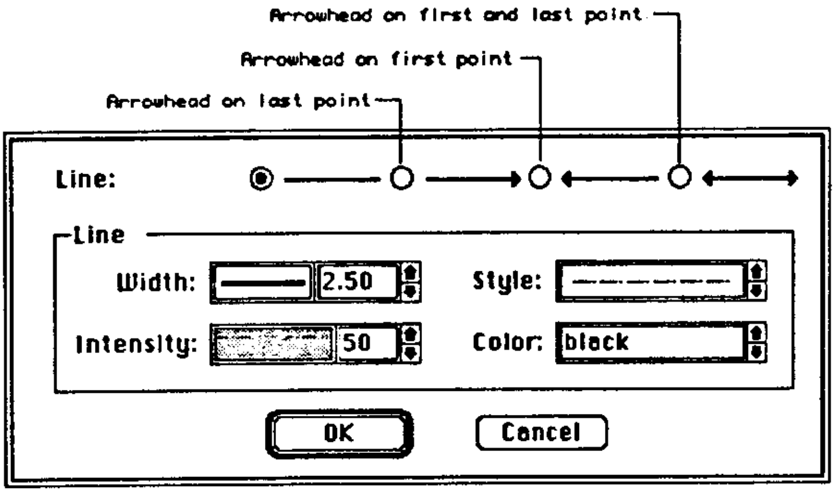
Starbursts

A Starburst is a set of lines radiating outward from a central point. To create a starburst, click on the starburst tool and then click on a point in the drawing area. Drag the cursor to a second point, creating an imaginary rectangle. The shape of the starburst is defined by the imaginary rectangle.

Changing Object Attributes

A number of object attributes can easily be changed by double-clicking on the object. A dialog box appears allowing you to make a variety of changes. The dialog box differs depending on the object but will always allow changes which are logical for that object.

A dialog box similar to the following appears for open-ended objects (e.g., lines, arcs, etc.).



Arrowhead on first and last point

Arrowhead on first point

Arrowhead on last point

Line: ● —— ○ ——→ ○ ←—— ○ ←——→

Line

Width: 2.50

Style:

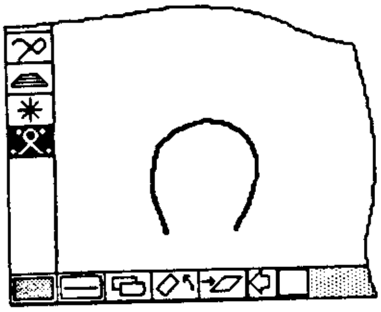
Intensity: 50

Color: black

You can select the pen width, style, intensity, and color for that object.

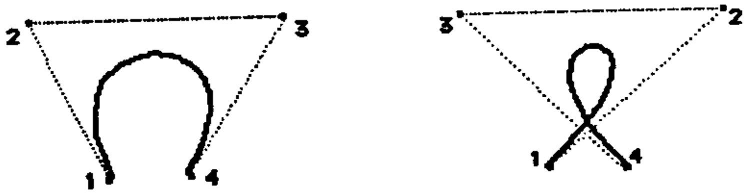
You can also specify the placement of arrowheads on open-ended objects (including arcs and Bezier curves). The first button specifies that no arrowheads will be placed. The second button allows you to place an arrowhead on the last point in the object. The third button allows placing the arrowhead on the first point in the object. To place arrowheads on both ends of the object, select the fourth button.

After clicking **OK**, the object is redrawn to reflect the change.

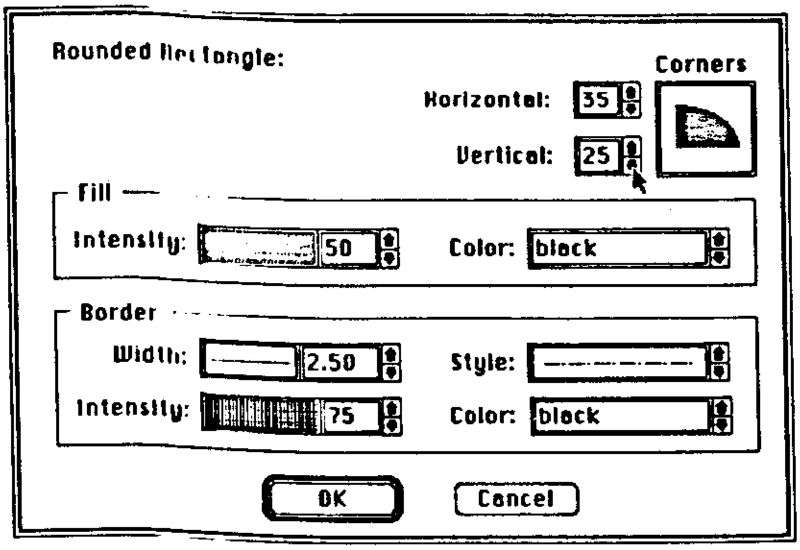


After you click to define the fourth and last point, the smooth fitted curve is drawn.

The order in which you define the four control points has significance (as illustrated in the diagram below).



The same four points defined in a different order will affect the shape of the Bezier curve.



Rounded Rectangle:

Corners

Horizontal: 35

Vertical: 25

Fill

Intensity: 50

Color: black

Border

Width: 2.50

Style:

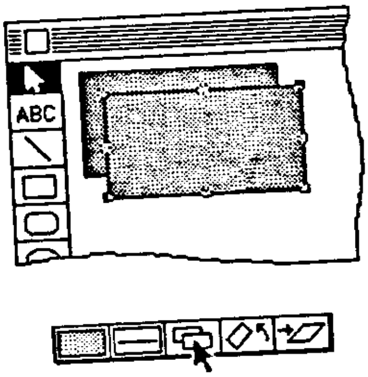
Intensity: 75

Color: black

Some dialogs allow you to set additional information. For example, after double-clicking on a rounded rectangle, you can set the object attributes you would normally expect of a rectangle. You can also set the half-width and half-height of an oval which describes the amount of rounding in the corners.

Duplicating Objects

To duplicate an object, you must first select it. There are two ways to select the duplicate function. You can click on the duplicate tool at the bottom of a drawing window or select **Duplicate** from the **Edit** menu. Either way, the selected object is duplicated and placed slightly offset from the original object.

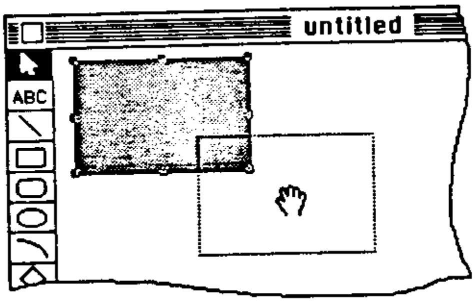


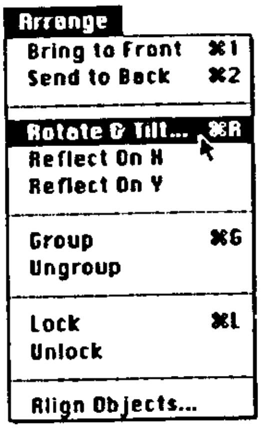
The advantage of using the **Duplicate** command from the **File** menu is that you can specify the number of times to duplicate the object and the amount of horizontal and vertical displacement (in units based on the currently selected ruler) for each duplicate. This allows you to duplicate an object many times with little inconvenience.

Clicking on an object selects that object and deselects other objects that were previously selected. To select more than one object, hold the **Shift** key down while clicking on the other objects.

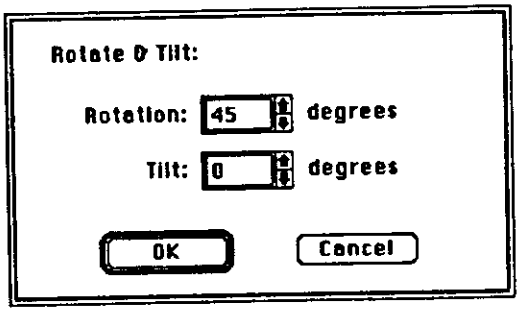
Moving Objects

The simplest thing to do with an object after it has been created, is to move it. To do so, click on the object and continue to hold the mouse button down. The cursor appears as a hand, and a rectangle bounding the object follows the mouse movements until the mouse button is released. The object is then redrawn at the new location.





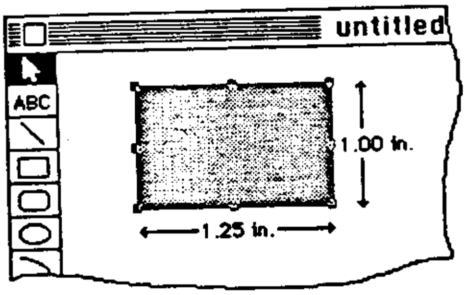
A second, and more precise, way of rotating one or more objects is to select **Rotate & Tilt** from the **Arrange** menu. A dialog box appears allowing you to set the exact angles, in degrees, that the object is to be rotated.


Rotate & Tilt:

Rotation: 45 degrees

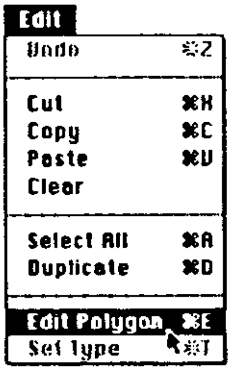
Tilt: 0 degrees

When you are drawing an object, specification lines appear showing the current dimensions of that object. The dimensions shown, when representing distances, will be based on the current ruler selection. Therefore, if inches is the current ruler system, the displayed numbers represent inches.



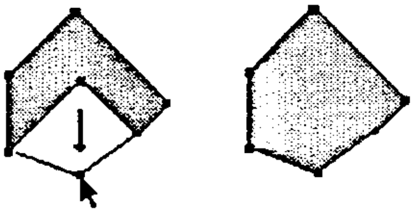
Of course, another way to precisely size an object is to have the rulers turned on and watch the dotted lines marking your cursor movement. By precisely positioning and then dragging your cursor when creating an object, you can use rulers for the same results.

Show Specs also displays the angle of an object while it is being rotated. The angle displayed is in degrees.

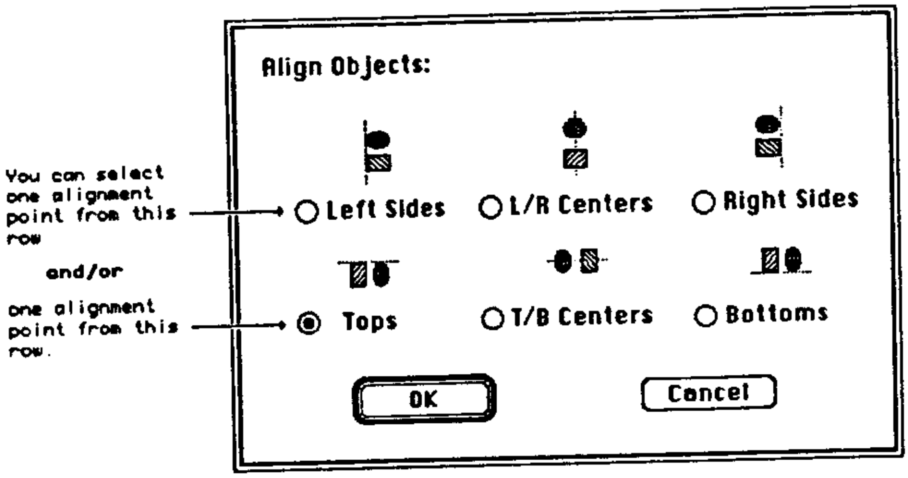


After clicking on the polygon to select it, the **Edit** selection in the **Edit** menu appears as **Edit Polygon.** This menu selection reflects the type of object that is currently selected. If the object cannot be edited, this menu selection is grayed out and inactive.

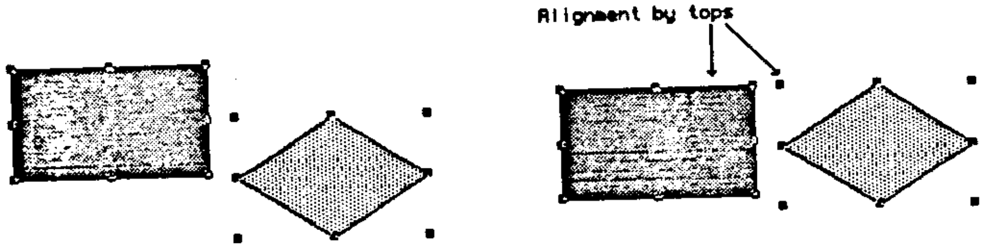
In this case, after selecting **Edit Polygon,** handles appear at each of the vertices of the polygon. You can click on and drag any one of the vertices. After you release the mouse button, the polygon is redrawn to reflect the changed vertex.



You can also add a vertex to a polygon by holding the **Option** key and clicking on a vertex. Another vertex is added next to the one you just clicked on. This is referred to as "cusping". The vertex that you just added to the object definition can be dragged to any desired location.



You can now align the objects by selected references. Click the button which represents the desired alignment. One selection can be made from each row of three options to allow alignment based on two criteria.



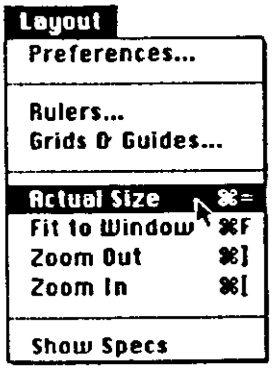
Prior to alignment

After alignment

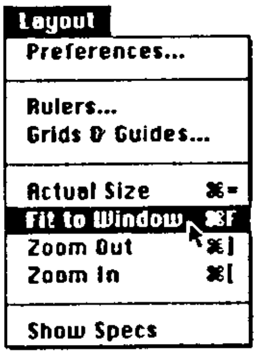
After clicking the **OK** button, the selected objects are aligned according to the criterion you just selected.

Zooming In and Out

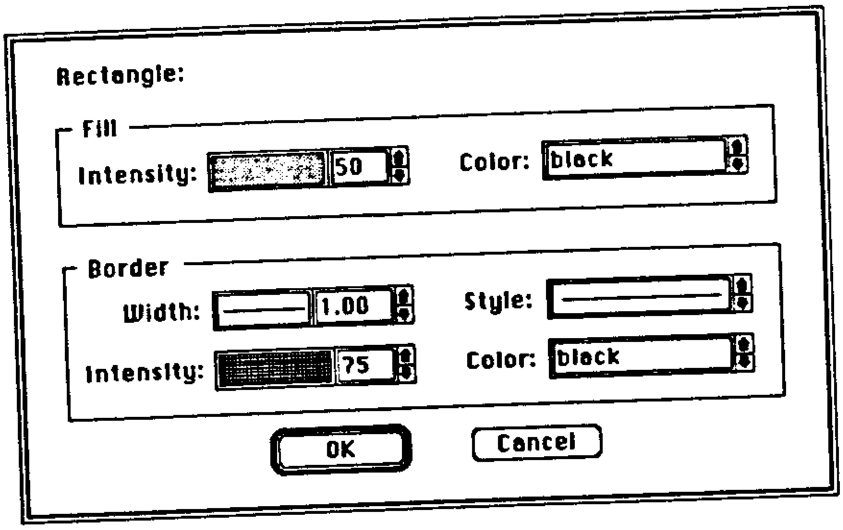
Sometimes when you are working on a particularly complex image, it may be easier to work at an enlarged scale. After you have finished, you can reduce the image to normal size.



In most instances, you will probably work on your drawing in "true" size. At any time, you can make sure your drawing is being displayed in true size by selecting **Actual Size** from the **Layout** menu.



If you wish to view the entire drawing area, select **Fit to Window** from the **Layout** menu. The entire drawing surface is scaled to fit the window.



Intensity: 50

Color: black

Width: 1.00

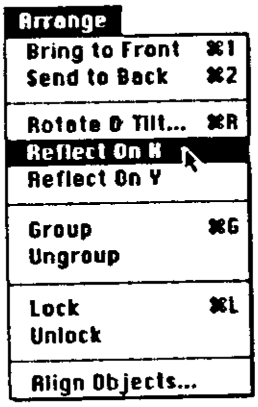
Intensity: 75

Color: black

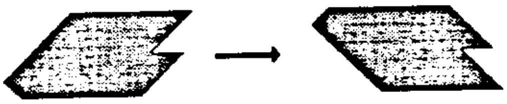
For closed objects (e.g., rectangles, ovals, etc.), you can change the object's fill and border from the dialog box that appears when you double-click on the object.

Reflection about X and Y Axes

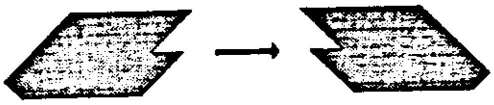
Any object can be reflected about its x or y axis. The reason that "reflection about its horizontal and vertical axis" is not said is that an object can be rotated so that the x and y axes are no longer horizontal and vertical.



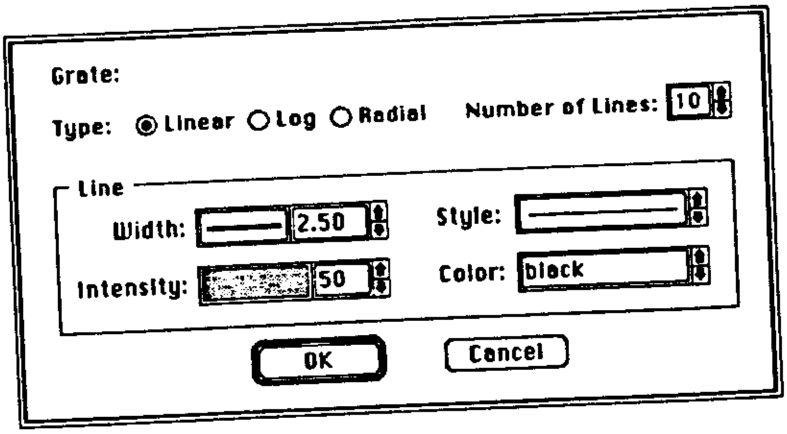
To reflect an object, simply click on the object to select it and then choose **Reflect On X** or **Reflect On Y** from the **Arrange** menu.



Reflected about the X Axis



Reflected about the Y Axis


Grate:

Type: ● Linear ○ Log ○ Radial Number of Lines: 10

Line

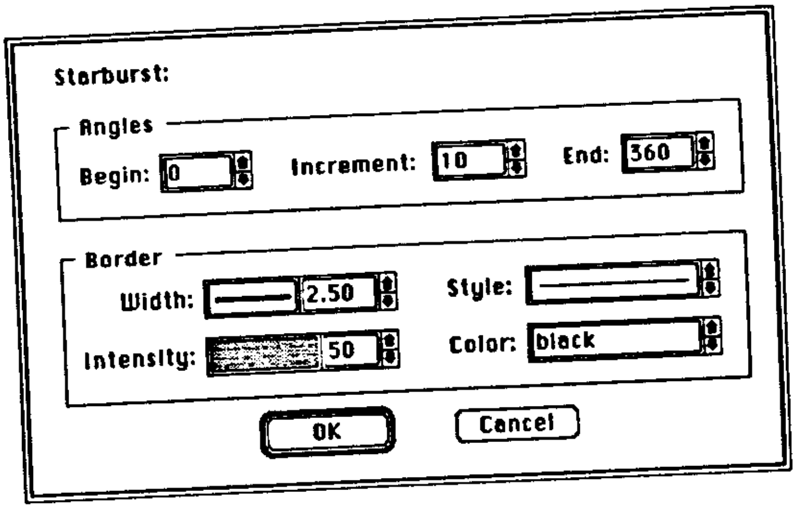
Width: 2.50

Style:

Intensity: 50

Color: black

The dialog box that appears after double-clicking a grate allows you to specify the type of grate, the number of lines, and the line characteristics.


Starburst:

Angles

Begin: 0

Increment: 10

End: 360

Border

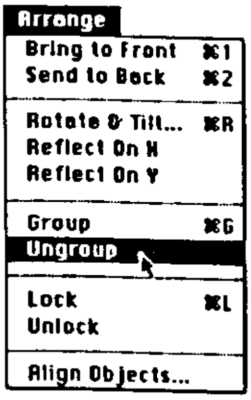
Width: 2.50

Style:

Intensity: 50

Color: black

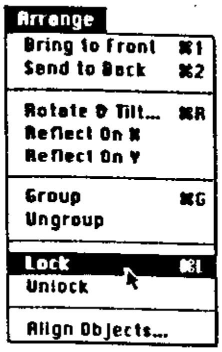
After double-clicking a starburst, a dialog appears that allows you to set the beginning, incremental, and ending angles. You can also specify the line characteristics.



Once objects are grouped, you can ungroup them at any time. Click on the grouped object to select it. Choose **Ungroup** from the **Arrange** menu. Handles now appear around each of the individual objects which made up the group. Each of these objects may now be modified individually.

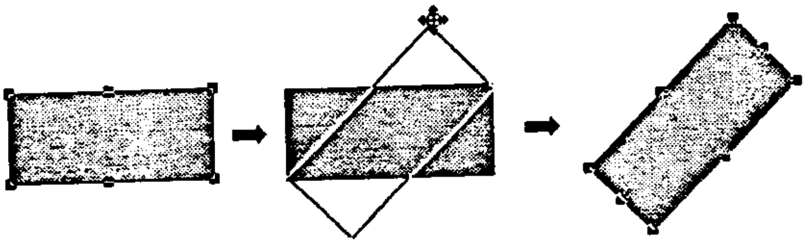
Locking and Unlocking

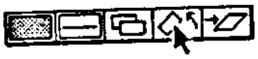
To prevent accidental changes to objects which you have carefully created, you may wish to lock those objects. Click on the object or objects you wish to lock and select **Lock** from the **Arrange** menu.



Rotating Objects

Rotating objects is accomplished in one of two ways.

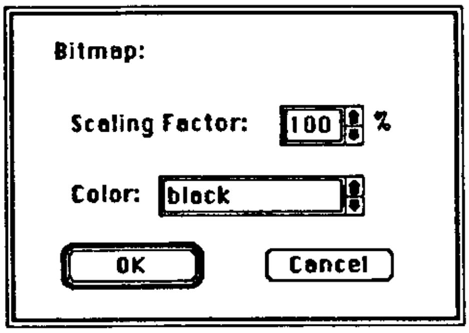




Select the object you wish to rotate by clicking on it. Click on the rotate control at the bottom of the drawing window. Click and drag any one of the eight handles to rotate the object as you move the cursor. After you release the mouse button, the object is redrawn at the new angle.

Scaling Bitmap Images

Double-click on a bitmap image and a dialog appears allowing you to specify the scaling factor (1-100%) and color for that bitmap.



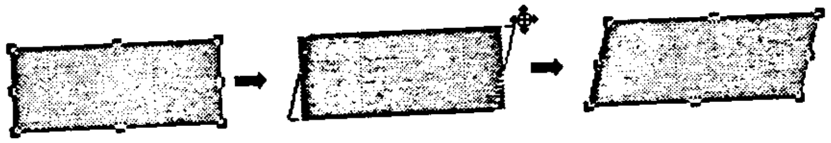
Scaling Factor: 100 %

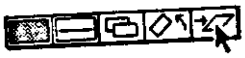
Color: black

Scaling does not alter the image permanently, it only affects the scale at which the image is displayed and printed.

Tilting Objects

To tilt an object, first select the object by clicking on it. Then click on the tilt tool at the bottom of the drawing window. Click and drag any one of the eight handles on the object. A gray border tilts with the mouse movements. When you have reached the desired level of tilt, release the mouse button. The object is redrawn to reflect the tilt.





The tilt angle, in degrees, may be specified exactly if you select **Rotate & Tilt** from the **Arrange** menu. A dialog appears allowing you to set the tilt.

Editing Object Boundaries

Although editing boundaries varies from object to object, the principles are much the same no matter what the object may be.

To illustrate the principles of editing an object, a previously defined polygon is selected.

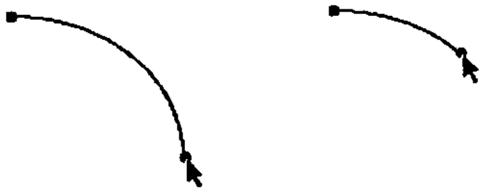
Chapter 5
Handling TEXT

Of all the things that Cricket Draw can manipulate, text is the most complex. The manipulation of text is one feature that truly distinguishes Cricket Draw from any other drawing program.

Versatile Text Entry

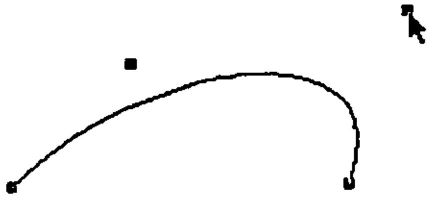
The text facility in Cricket Draw is somewhat like MacWrite™. Multi-line blocks of text can be entered. Font and style changes can occur anywhere within the block of text.

Arcs can also be edited so that the beginning and ending angles can be modified to suit your particular needs. Click on the arc to select it.



Choose **Edit Arc** from the **Edit** menu. A handle appears at each end of the arc. The handle for the beginning point in the arc appears as a circle while the handle for the ending point appears as a square. Knowing the beginning and ending points for an arc becomes important when placing text along an arc (Chapter 6). Click on either handle and drag the mouse. The arc will follow the movement of the cursor.

To edit a Bezier curve, click on the Bezier curve to select it and choose **Edit Curve** from the **Edit** menu.

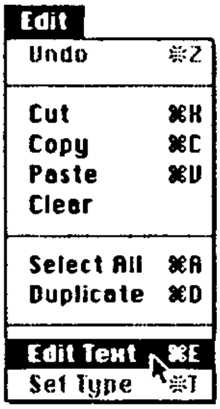


The Bezier curve can now be changed by dragging any one of the four control points around the drawing area. The curve changes shape as the control points change position. This allows you to interactively modify the shape of the curve.

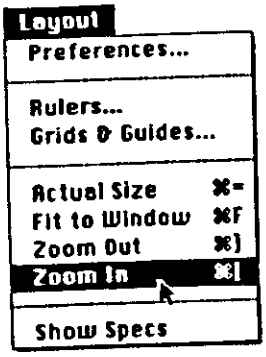
Clicking anywhere outside the edit rectangle or pressing the **Enter** key removes you from the text entering mode.

Editing Text

To edit an existing block of text, you first select the text by clicking on it.

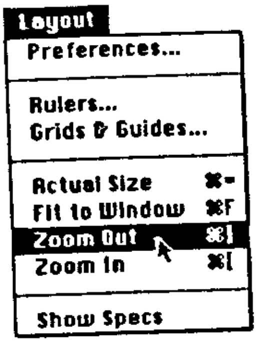


Select **Edit Text** from the **Edit** menu and a flashing bar appears at the beginning of the block of text. You are now in the text editing mode, and can cut, copy and paste just as in MacWrite. Text can be pasted in from the Clipboard. MacWrite formatted text can be pasted in as well, with its formatting intact.



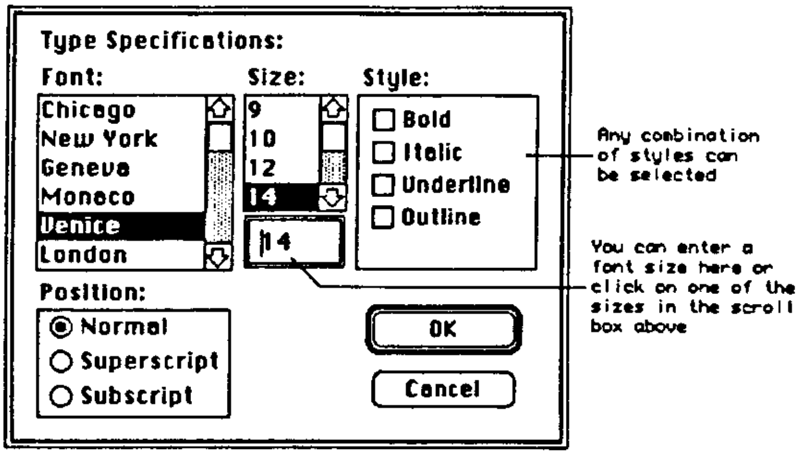
To work on a drawing at twice its actual size, select **Zoom In** from the **Layout** menu.

Each time that you select this menu item, the viewing scale is increased by a factor of 2. You can zoom in to a maximum of eight times the actual size of the drawing.



To reduce a drawing to half its actual size, select **Zoom Out** from the **Layout** menu. Each time you select this menu item, the drawing display is decreased by half to a maximum reduction of one-eighth its actual size.

A dialog box appears allowing you to change a number of font attributes.



Type Specifications:

Font: Chicago, New York, Geneva, Monaco, **Venice**, London

Size: 9, 10, 12, **14** — 14

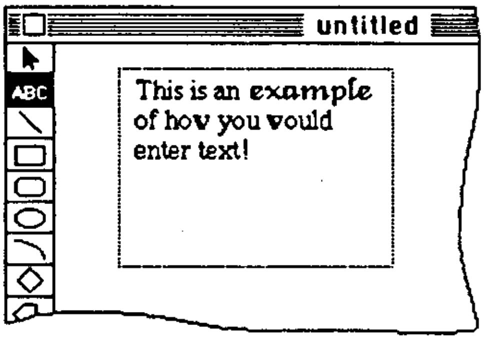
Style:
- ☐ Bold
- ☐ Italic
- ☐ Underline
- ☐ Outline

Position:
- ● Normal
- ○ Superscript
- ○ Subscript

Any combination of styles can be selected

You can enter a font size here or click on one of the sizes in the scroll box above

You may select the font, size, style and position (superscript, etc.).

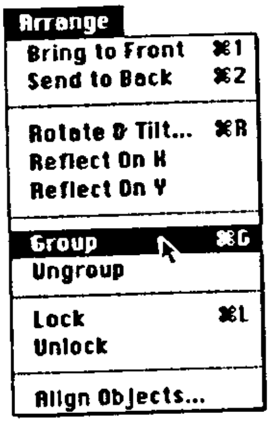


This is an *example* of hov you vould enter text!

After clicking the **OK** button, the selected text changes to reflect the new settings. You can continue to change text within the block until you click anywhere outside the edit rectangle.

Grouping and Ungrouping

A useful feature of an object-oriented drawing program is the ability to group objects so that they can be treated as one. By using this feature, you can make a complex object by creating small pieces and then grouping.

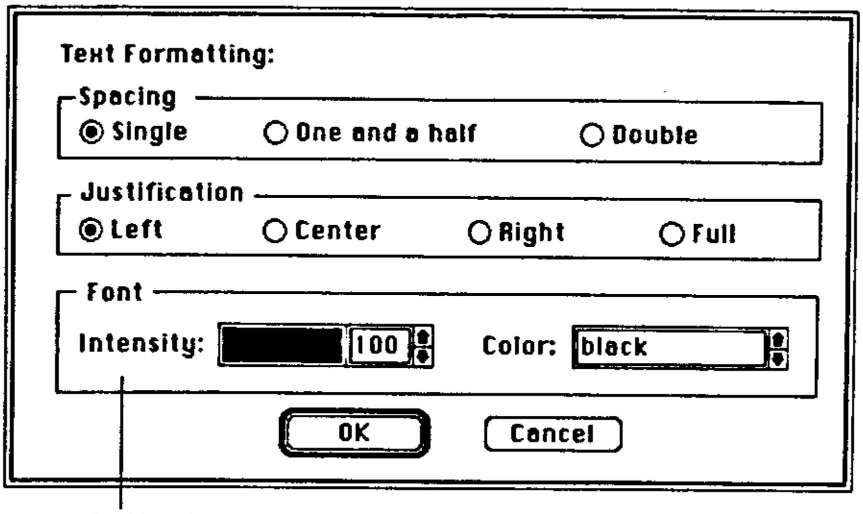


Hold the **Shift** key down while clicking on the objects you wish to group. Handles appear on each object to show that it has been selected. Select **Group** from the **Arrange** menu. The handles around each object disappear and a new set of handles appears about an imaginary rectangle surrounding the entire group of objects.

Complex (grouped) objects can be modified as if they were composed of only a single object. With a little practice, the grouping function can become your strongest tool for creating complex images.

Formatting a Text Block

By double-clicking on the block of text, you can change the format of the text. The following dialog box appears.



Text Formatting:

Spacing
● Single ○ One and a half ○ Double

Justification
● Left ○ Center ○ Right ○ Full

Font
Intensity: 100
Color: black

Applies to the text characters within the text block.
However, gray levels can not be represented on the screen.

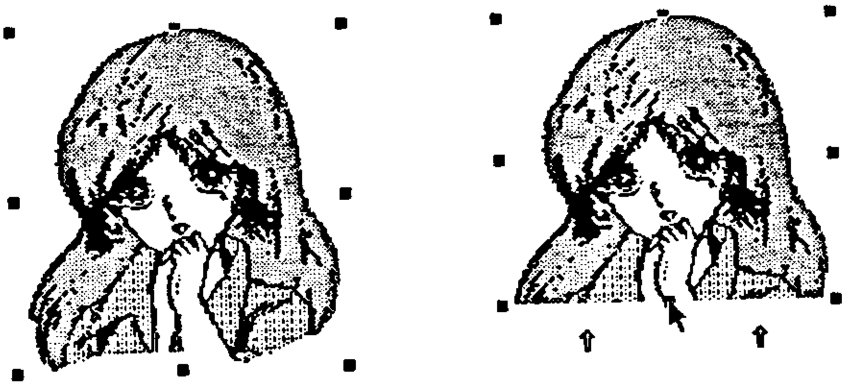
From this dialog, you can change the line spacing and justification. You can also select an intensity and color for the text characters (only black or white will be displayed on the Macintosh screen).

After selecting the proper format, click the **OK** button and the body of text is redrawn to reflect the changes.

A locked object cannot be modified or repositioned until it is unlocked. The **Arrange** menu contains a selection for unlocking an object.

Cropping Bitmap Images

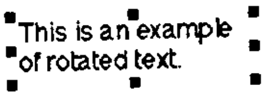
After selecting a bitmap by clicking on it, you can crop (trim) the edges. Click and drag a handle on the side of the image you wish to crop. After you release the mouse button, the image is redrawn but only that portion between the handles is visible.

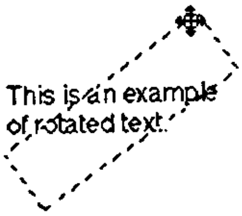


Cropping an image does not remove a portion of the image, it only determines what portion of the image is visible. A cropped bitmap can be returned to its original size.

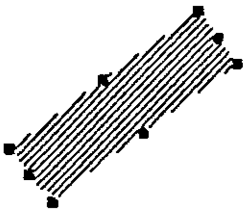
Rotating a Block of Text

After clicking on text to select it, you can also use the rotation tool at the bottom of the drawing window to rotate the block of text as a whole.

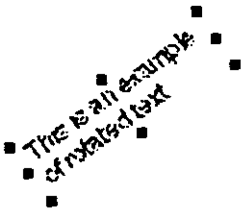




After clicking on the rotation tool, dragging any one of the eight handles allows you to rotate a gray rectangle representing the block of text.



Animation is OFF



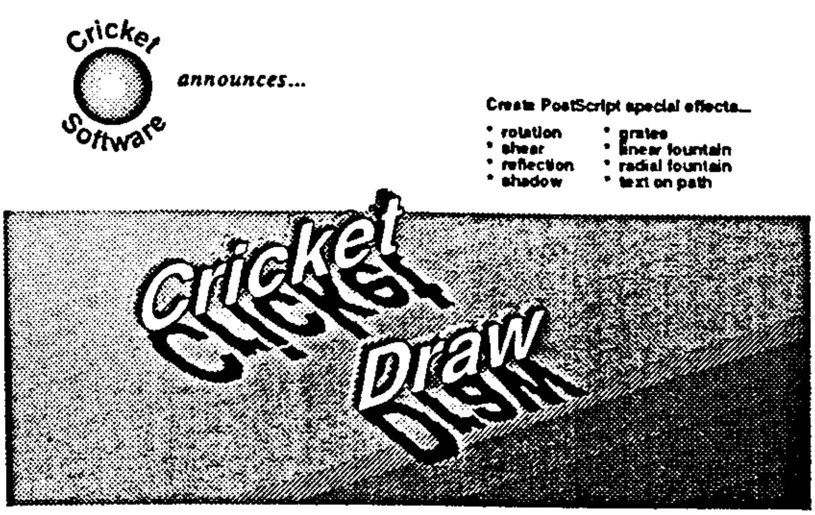
Animation is ON

Releasing the mouse button causes the text to be rotated to the angle selected.

You can also use the **Rotate & Tilt** command from the **Arrange** menu to rotate the block of text.

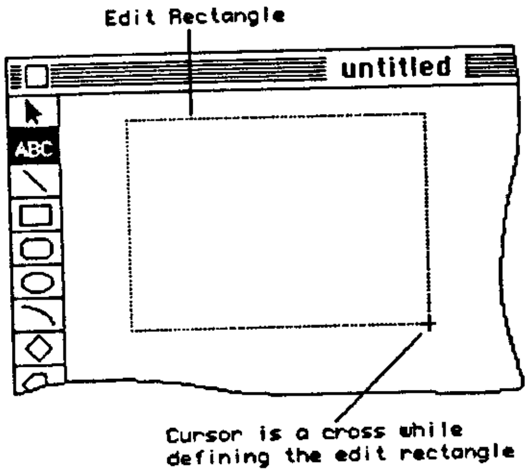
Chapter 6
Using Special Effects

PostScript is a powerful page description language that works well with high-resolution printing devices. With it you can create complex special effects that are nearly impossible for an artist to create in a reasonable amount of time. Cricket Draw allows you to create a variety of special effects with the speed and simplicity you expect from a Macintosh.

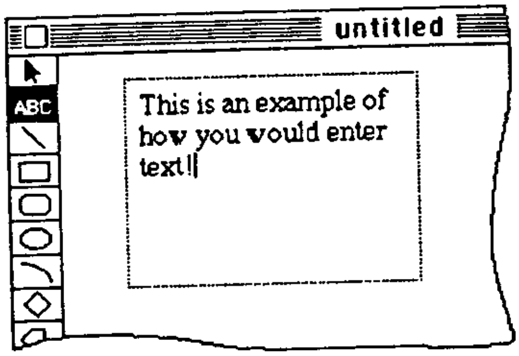


Creating a Text Block

After clicking on the ABC tool for text, you must then drag a rectangle on the drawing area. This rectangle defines the initial boundaries within which the text will appear.

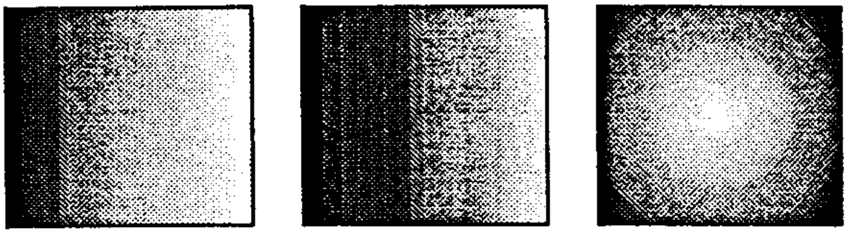


After having defined the edit rectangle, Cricket Draw is automatically in text entry mode. You can begin typing your text into this block. Word-wrap, the ability to ensure that whole words aren't split at the end of a line, is automatically handled for you.



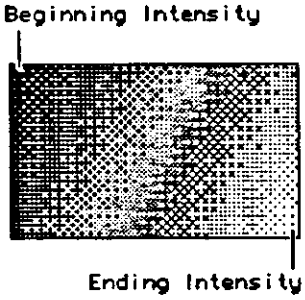
This is an example of how you would enter text!

Fountains



Linear **Log** **Radial**

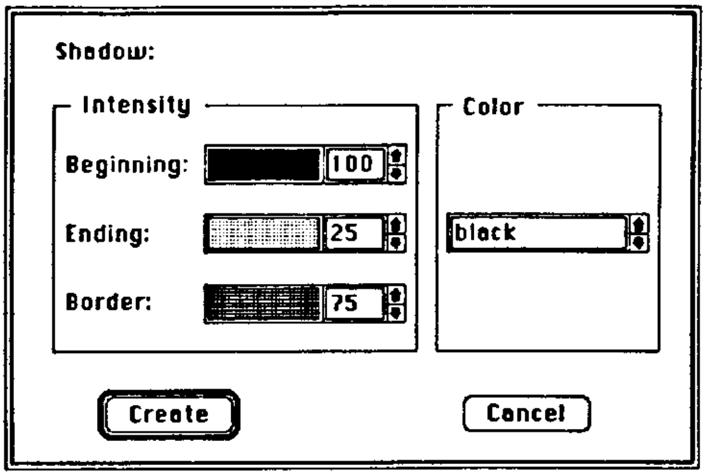
Select the beginning and ending gray scales for the fountain effect.



If the selected object was already fountained, a **Remove** button appears in this dialog. Click on this button to remove the fountain from the object. If you wish to create a fountain using the current settings in the dialog, click the **Create** button.

Rather than going through the **Set Type** dialog, you can change a number of font attributes on selected text by using **Command** key pairs. This is accomplished by holding the **Command** (⌘) key down while pressing the appropriate key. The Command key pairs and their functions are as follows...

⌘ **P**	Convert to Plain Style
⌘ **B**	Convert to Bold Style
⌘ **I**	Convert to Italic Style
⌘ **U**	Convert to Underline Style
⌘ **O**	Convert to Outline Style
⌘ **>**	Increase Font Size by 1 Point
⌘ **<**	Decrease Font Size by 1 Point



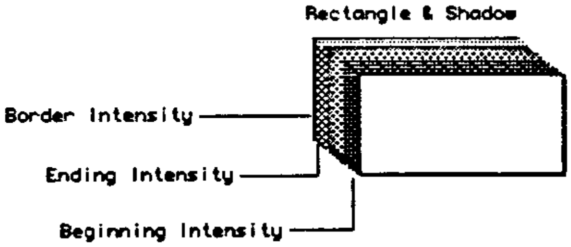
Beginning: 100

Ending: 25

Border: 75

black

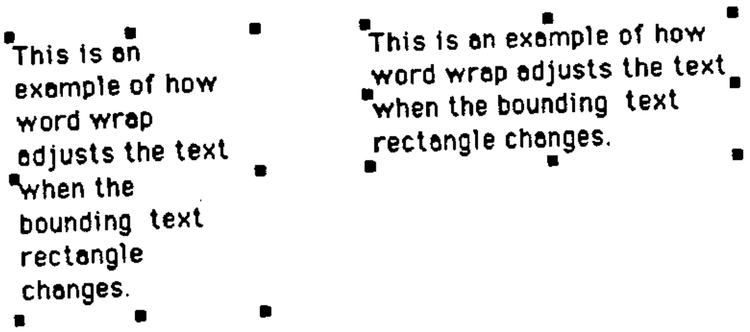
Select the beginning and ending intensities as well as the intensity for the far outer border of the shadow. Also, select the appropriate color.



If the selected object was already shadowed, a **Remove** button appears in the dialog. Click on this button to remove the shadow from the object. If you wish to create a shadow using the current settings in the dialog, click the **Create** button.

Resizing and Moving a Text Block

Text is treated as an object. In this case the entire block of text is an object.



This is an example of how word wrap adjusts the text when the bounding text rectangle changes.

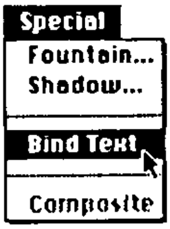
This is an example of how word wrap adjusts the text when the bounding text rectangle changes.

Clicking anywhere on the block of text selects it and a border with handles appears around it. Dragging the handles resizes the edit rectangle. It does not resize the characters in the text. Note, however, that the text in the block continues to automatically wordwrap even as you change the size of the rectangle.

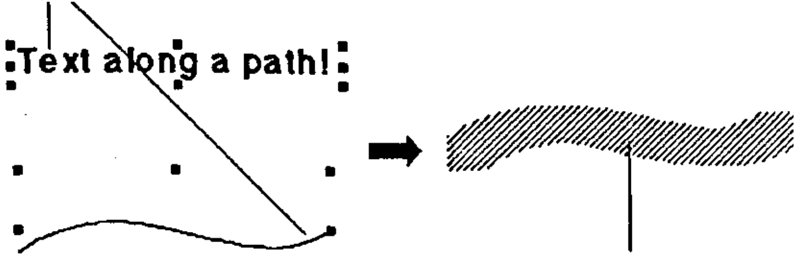
You can also click in the text and drag, as though you were dragging a normal rectangle. This allows you to reposition body text anywhere in the drawing.

Text Along a Path

If you click on an open-ended object (the two ends of the object do not meet) and a text object while holding the **Shift** key, the menu command **Bind Text** becomes active.

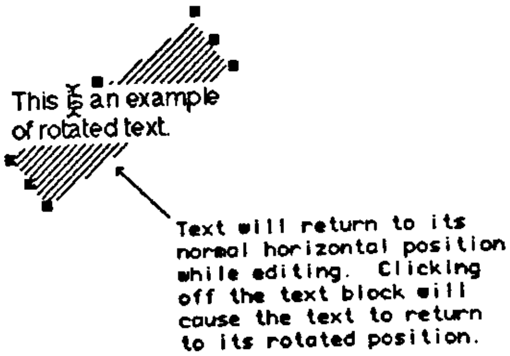


By selecting **Bind Text** from the **Special** menu, the text is placed with each character positioned along the border of the object in the best possible means. The path becomes invisible and the text on screen is represented by a diagonal pattern.



Select Bind Text from the Special menu while text and an open-ended object are selected

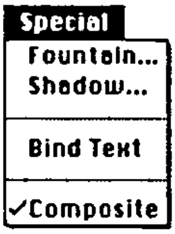
Text along a path is always represented by diagonal lines



Text will return to its normal horizontal position while editing. Clicking off the text block will cause the text to return to its rotated position.

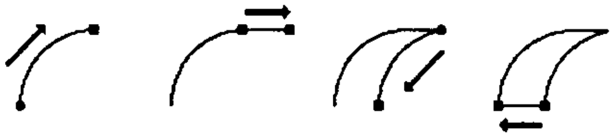
Clicking on rotated text and then selecting **Edit Text** from the **Edit** menu, causes the text to temporarily snap back to its original horizontal position. You can then edit the text. After you click off the text or press the **Enter** key, the text returns to its rotated position. The same thing applies to tilted text.

Cricket Draw provides the necessary tools to create special effects using text that no other application has ever allowed. You must always keep in mind that the screen representation of text is at best only an approximation to what is printed on the PostScript printer. The screen representation might appear messy but the printed output appears neat and clean.



There are several indications that you are in composite mode. First, the **Composite** menu command has a check beside it indicating that the composite mode is on. Second, a number of tools in the tools palette are grayed out and inoperative. The tools still active are tools which allow you to create open-ended objects. Composites can only be composed of open-ended objects.

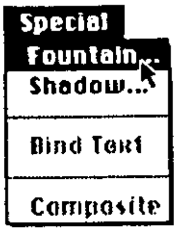
Click on a tool for the first open-ended object to be placed in the composite. Create the object. Select the next tool to create the second object in the composite.


Creating a composite using four open-ended objects. Remember, handle at first point in arc is a circle instead of a square. Arcs and all other paths must continue to travel in some general direction.

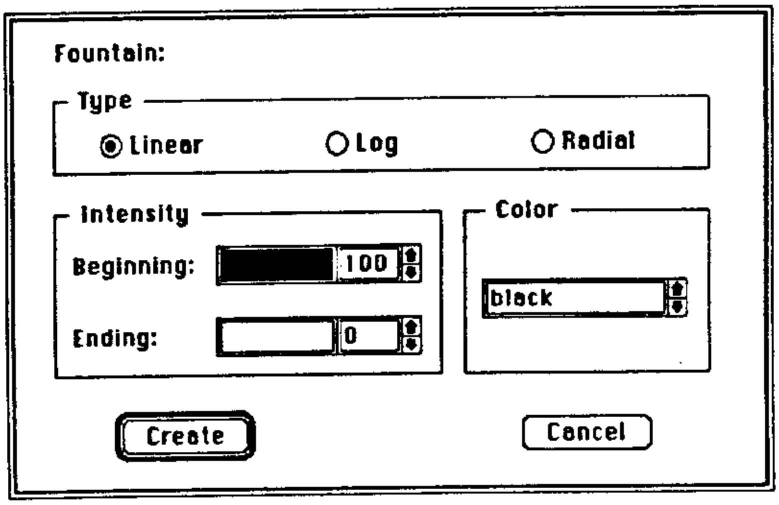
It is very important that when you create this object, you start at the ending point of the first object that you created. Each time that you add an object to a composite, it's beginning point must match the ending point of the previous object.

Fountaining

Fountaining is the shading of an object from one gray intensity to another with the changes in gray blending evenly.



Click on an object to select it and then choose **Fountain** from the **Special** menu.



Fountain:

Type
● Linear ○ Log ○ Radial

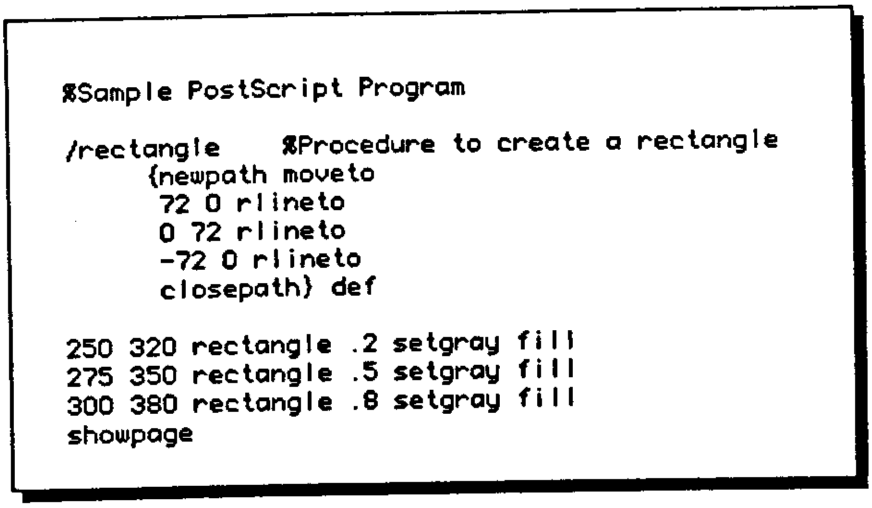
Intensity
Beginning: 100
Ending: 0

Color
black

A dialog box appears allowing you to select one of three types of fountain: linear, logarithmic or radial. Click the button of the desired type of fountain.

Chapter 7
The PostScript Window

PostScript is a page-description language developed by Adobe Systems Incorporated. It allows computer users full freedom with text and graphics, including rotated text, halftones, and images of any size or shape.

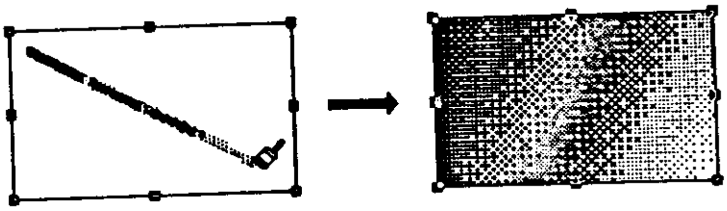


```
%Sample PostScript Program

/rectangle    %Procedure to create a rectangle
     {newpath moveto
      72 0 rlineto
      0 72 rlineto
      -72 0 rlineto
      closepath} def

250 320 rectangle .2 setgray fill
275 350 rectangle .5 setgray fill
300 380 rectangle .8 setgray fill
showpage
```

Finished documents can be printed interchangeably on a wide range of output devices, from medium resolution office printers to high-end typesetters and film recorders.

The Apple LaserWriter is an example of a popular office printer that uses the PostScript language.

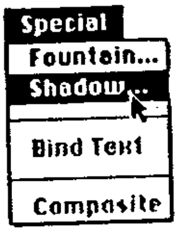
The cursor appears as a paint brush. By clicking and dragging the paint brush over the selected object, you can set the angle of fountaining.



The fountain line (going from black to a lighter gray) follows the mouse movements until you release the mouse button. The angle of the line at the time you release the mouse button determines the angle of fountaining and the object is redrawn filled with the proper fountain.

Shadowing

By first selecting an object and then choosing **Shadow** from the Special menu, you can add a shadow to give a three-dimensional effect.



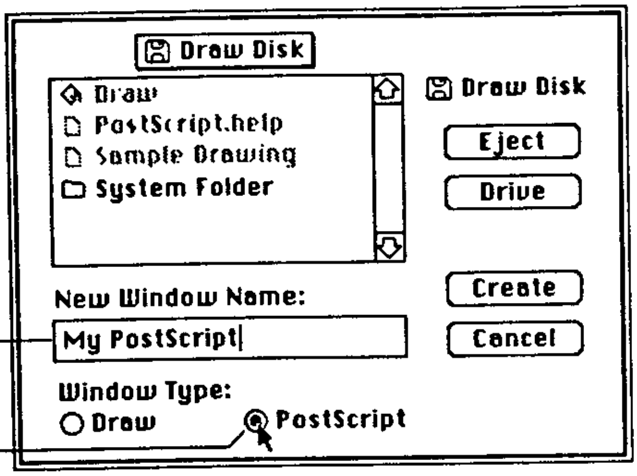
After selecting the **Shadow** command, a dialog appears allowing you to set several options.

Available Menus

The menu selections change depending on whether the active window is a Drawing window or a PostScript window. Cricket Draw does this so that you can have the best of both worlds: a drawing environment that lets you create complex PostScript images without ever knowing how to program in PostScript; and a PostScript window which allows you to program in PostScript by providing a complete PostScript editor.

Creating PostScript

The first step in working directly with PostScript is to create a PostScript window by selecting **New** from the **File** menu.



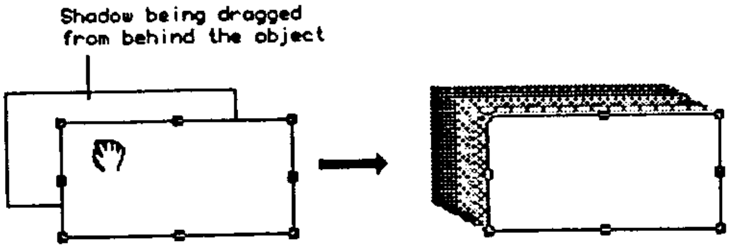
New Window Name: My PostScript

Window Type:
○ Draw ● PostScript

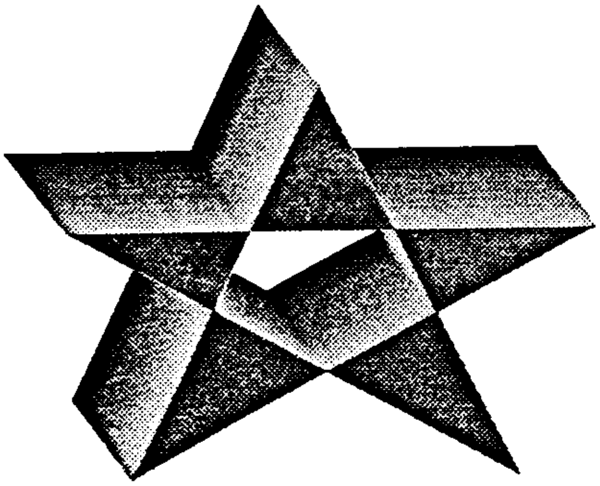
Enter a name for the window

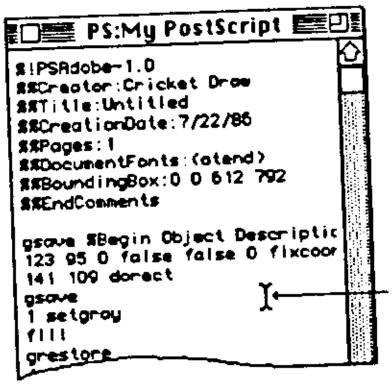
Click this button to create a PostScript window

A dialog box appears allowing you to enter a name for this new window. You can also select which folder to save the contents of the window in. Most importantly, be sure to select the button labeled **PostScript** so that a PostScript window is created.



By clicking on the object and holding the mouse button down, you can drag a shadow from behind. The position of the shadow when you release the mouse button determines the depth and direction for the shadow.





```
%!PSAdobe-1.0
%%Creator:Cricket Draw
%%Title:Untitled
%%CreationDate:7/22/86
%%Pages:1
%%DocumentFonts:(atend)
%%BoundingBox:0 0 612 792
%%EndComments

gsave %Begin Object Descriptic
123 95 0 false false 0 fixcoor
141 109 dorect
gsave
1 setgray
fill
grestore
```

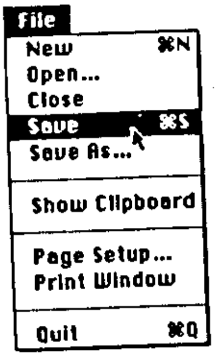
The cursor changes to an "I-Beam" cursor when it is in the PostScript window.

Scrolling Around

A vertical scroll bar is available to view or edit the PostScript even when the actual code cannot be viewed at one time. Scrolling is accomplished as in any other Macintosh application.

Saving the PostScript

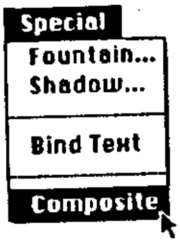
To save the PostScript code for later recall, select **Save** from the **File** menu. The PostScript in the active PostScript window is saved on disk under the name that you assigned to the PostScript window when you created it.



If you click and select bound text, the menu selection **Bind Text** becomes **Unbind Text** in the **Special** menu. Selecting this command unbinds the text from the path. If you wish to edit bound text, you must first unbind it.

Creating Composites

Sometimes you can create an object more easily if you have a way to merge arcs, lines, open-ended polygons and freehand lines. Cricket Draw allows you to do this.



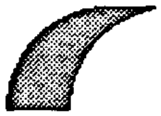
To create a composite, select **Composite** from the **Special** menu. This places you in a mode which allows composites to be created by adding objects one at a time.

If you wish to include the PostScript header, click on the **Complete** button. This option needs to be selected if Cricket Draw is not going to be used to download the file to the printer (e.g., the file is being transmitted to a service bureau for typesetting).

The **EPSF** button should be selected if you wish to save the PostScript in this type of format (see Appendix C for more details). A few Macintosh applications are planning on importing this type of file.

After clicking the Save button, the PostScript code is saved as a simple ASCII text file and can be read by any Macintosh editor, including word processors. If you do not own a PostScript printer, you may find this feature extremely handy. The PostScript text files can be sent via modem or mailed to someone who has a PostScript printer. They could then print the images for you. Many service bureaus are available to provide such services.

The composite mode continues until you end an object at the first point of the first object in the composite (essentially closing the composite) or until you select the checked **Composite** menu command, which turns off the composite mode.

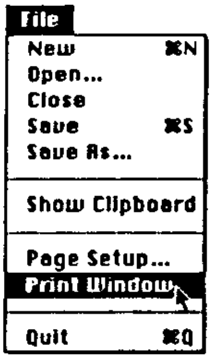


A filled composite

Once out of the composite mode, you can treat the composite like any other closed-object. Therefore, you can change its border and fill.

Printing the PostScript Program

The contents of the active PostScript window can be printed using **Print Window** from the **File** menu.



The PostScript code - NOT the actual image - is printed. This allows you to get a printout of the PostScript program.

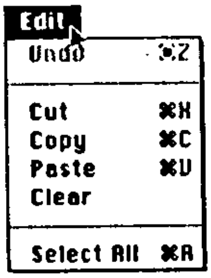
With most Macintosh applications, screen graphics (referred to as QuickDraw) are translated into PostScript statements and then sent to the PostScript printer. This allows any Macintosh application to print to a PostScript printer. The disadvantage is that you can only do what QuickDraw is capable of doing. PostScript is much more flexible and can do many things that are extremely difficult or impossible for QuickDraw to do.

Cricket Draw lets you define objects and their attributes and a PostScript program is generated which describes these objects. This allows for much more flexibility. The problem is that sometimes it is difficult for QuickDraw to represent on the Macintosh screen how the PostScript is going to appear. However, the best attempt is always made.

In most cases, you do not need to use the PostScript window. In fact, many people may forget that another world lurks beyond the Drawing window. Hopefully, that is the case, because you should be able to accomplish everything you want from the Drawing window.

The PostScript window is for those few cases where you must manipulate the PostScript directly. An alternative is for you to write a program in PostScript using the PostScript window.

PostScript programs are simple ASCII text files that contain the PostScript commands. Therefore, they are easily edited and transmitted.

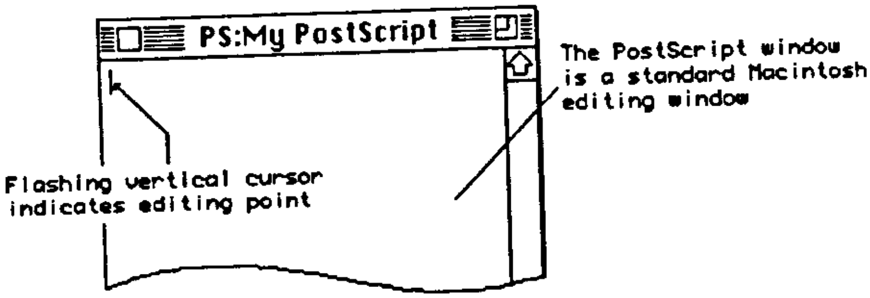


Editing commands always affect the selected area in the PostScript window. The selection could be a blinking insertion bar indicating the insertion point or a block of characters highlighted in black.

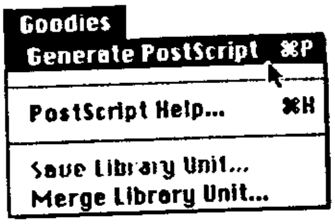
Once a range of text is selected (to select a range of text, drag the cursor over the intended area), you can cut or copy the selection to the Clipboard for transfer to another program or another portion of the PostScript program. **Cut** removes the selected text from the current location to the Clipboard while **Copy** makes a duplicate before transferring to the Clipboard.

If text is located on the Clipboard, the **Paste** command in the **Edit** menu becomes active. Pasting puts the contents of the Clipboard into the selected area of the PostScript window. If the selection is a range of text, **Paste** replaces the selection with the contents of the Clipboard.

The **Clear** command removes the selected text from the PostScript window. If you wish to select all the text in a PostScript window, use the **Select All** command from the **Edit** menu.

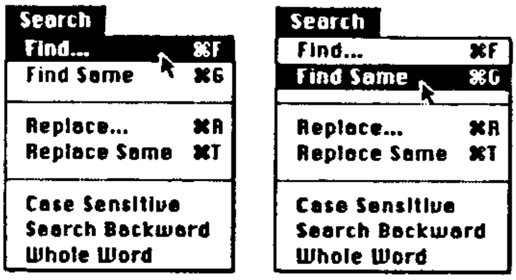

PS:My PostScript
The PostScript window is a standard Macintosh editing window
Flashing vertical cursor indicates editing point

After clicking the **Create** button, a PostScript window is opened with the name that you specified. A flashing "I-beam" cursor appears at the top of the window. This is your point of editing.

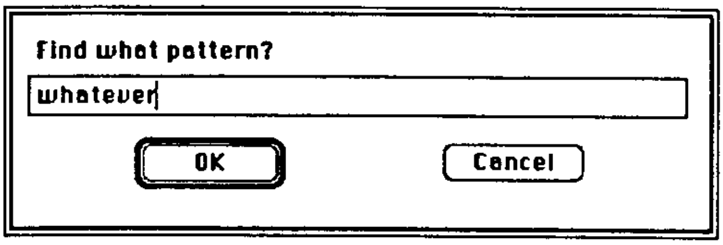


To convert a drawing into "raw" PostScript, select **Generate PostScript** from the **Goodies** menu. The image in the Drawing window closest to the front is automatically converted into its PostScript representation and placed into the PostScript window.

Finding



Once the desired search options are set, select **Find** from the **Search** menu. The following dialog appears.

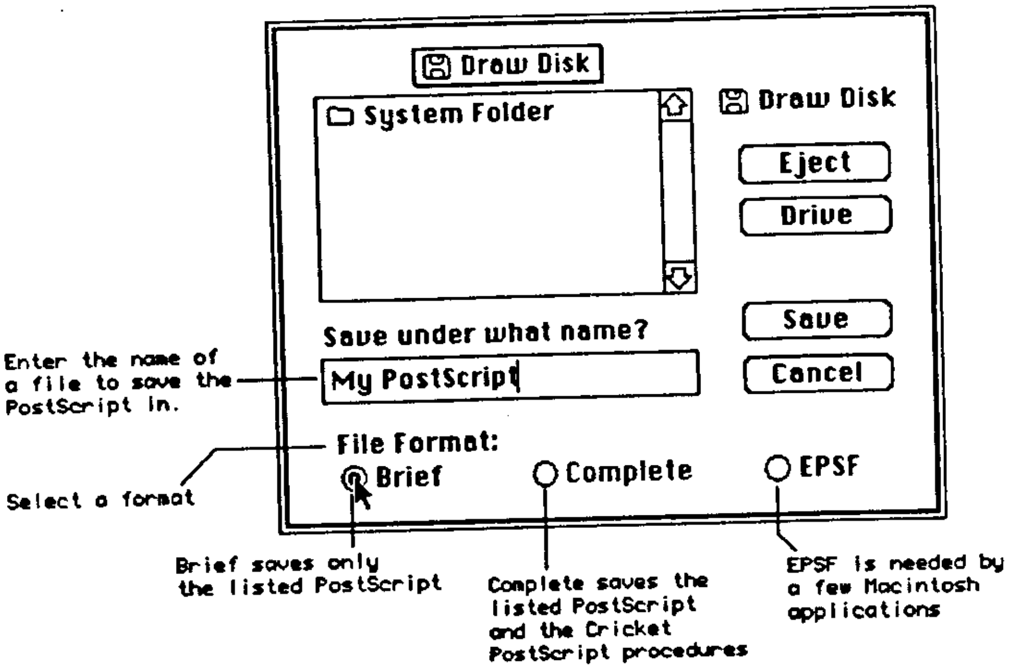

Find what pattern?

whatever

Enter the text that you wish to search for and then click **OK**. The search begins at the current selection point and continues to the end of the text unless you have the backwards option set, in which case it searchs toward the beginning of the text.

Once Cricket Draw has located the text you are searching for, it highlights it. To search for the same word again, select **Find Same** from the **Search** menu. If the text is not found at all, the Macintosh reports that the search item was not found.

If the PostScript window is untitled or Save As is selected from the File menu, a dialog appears allowing you to specify the name and folder in which to save the file.



Save under what name?
My PostScript

File Format:
● Brief ○ Complete ○ EPSF

Enter the name of a file to save the PostScript in.

Select a format

Brief saves only the listed PostScript

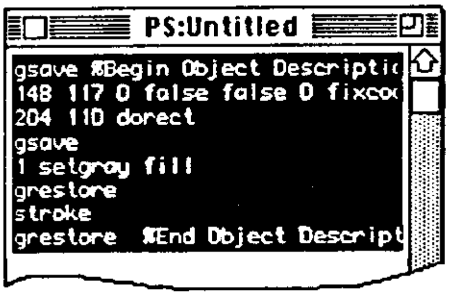
Complete saves the listed PostScript and the Cricket PostScript procedures

EPSF is needed by a few Macintosh applications

You can save the PostScript text file in one of three ways. The brief format saves the PostScript text and does not include the Cricket Draw PostScript " Header" (a group of procedures that actually implement all the objects and special effects). Including the PostScript header in the file adds about 15,000 bytes to the length of the code. In most cases, you should save the PostScript in the brief format by clicking on the Brief button.

Using Libraries

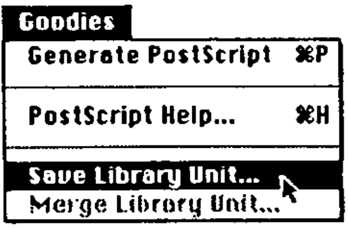
PostScript library commands provide a way of storing correctly operating procedures so that they can be placed in other locations of your program or in other programs without typing them over. A PostScript library is similar to the Macintosh Scrapbook, which can permanently store several pieces of information at the same time.



```
gsave %Begin Object Descripti
148 117 0 false false 0 fixco
204 110 dorect
gsave
1 setgray fill
grestore
stroke
grestore  %End Object Descript
```

Select the portion of the PostScript you wish to save as a library unit. Library units can be recalled for future use.

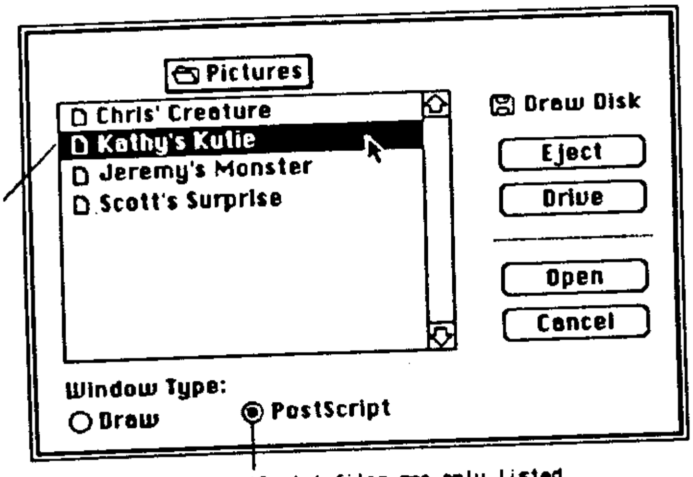
Once you have written a PostScript procedure, you can save it as a library unit. Select the procedure by dragging over it. Selection is indicated by highlighting in black.



Choose **Save Library Unit** from the **Goodies** menu. A dialog box appears.

Recalling PostScript

Saved PostScript files can be recalled by selecting **Open** from the **File** menu.

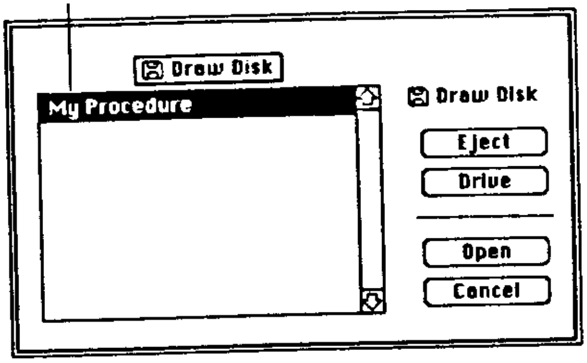


Double-click on the file name to open it

PostScript files are only listed when this button is selected

Once the open dialog appears, click the **PostScript** button. Only text files are displayed among the file selections.

Double-clicking on the desired file name opens that file and places the contents in a new PostScript window.

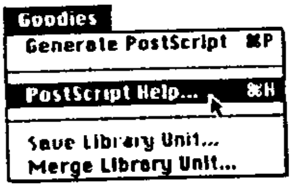


Double-click on the library name that you wish to merge into the PostScript window. Be sure to first set the proper insertion point.

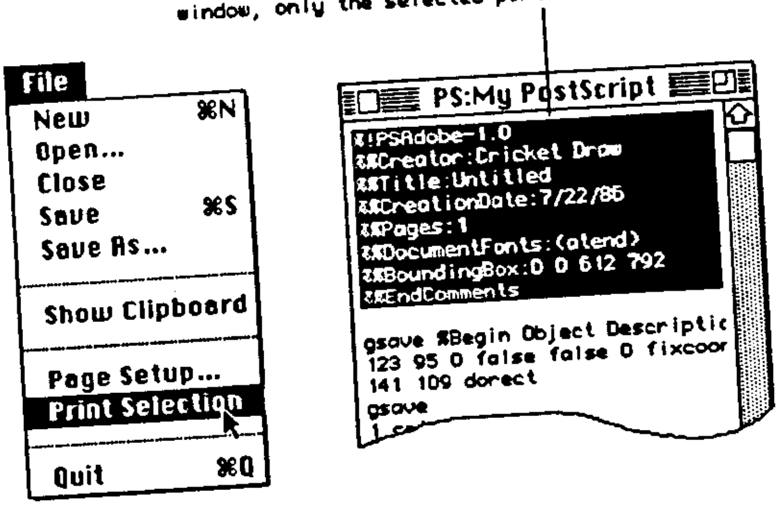
By using the library functions, PostScript procedures which you have previously developed, can be reused in new PostScript programs.

Help When You Need It

PostScript is a stack-oriented language that uses postfix notation (if you don't know what this means, don't worry about it) and therefore it is sometimes difficult to keep track of the parameters and order which each PostScript command expects.



By selecting **PostScript Help** from the **Goodies** menu, you can quickly verify the parameters and their proper order for valid PostScript commands.



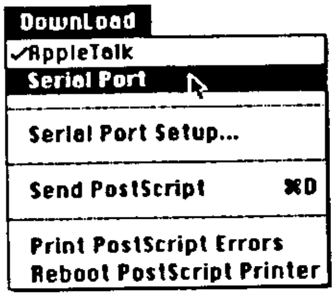
When text is selected in the PostScript window, only the selected portion is printed

```
%!PSAdobe-1.0
%%Creator:Cricket Draw
%%Title:Untitled
%%CreationDate:7/22/85
%%Pages:1
%%DocumentFonts:(atend)
%%BoundingBox:0 0 612 792
%%EndComments

gsave %Begin Object Descriptic
123 95 0 false false 0 fixcoor
141 109 dorect
gsave
```

If you wish to print only a selected portion of the PostScript code, drag the cursor over the intended section of the program and the **Print Window** command changes to **Print Selection**. Selecting this command causes only the selected portion of the code to be printed.

Basic Editing

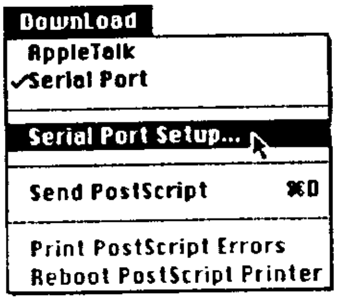
Once a PostScript program is created, you can change the program. Cricket Draw provides you with editing tools that you expect from a text file editor.



To select the proper port, drag the cursor through the **DownLoad** menu until the port you wish to select is highlighted, then release the mouse button. To indicate which of the two port options is currently selected, a check mark appears beside the active option.

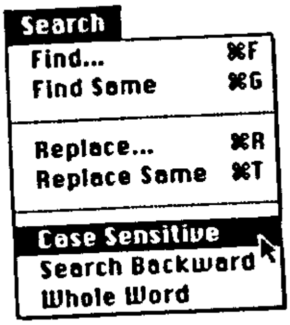
Serial Port Configurations

To configure the serial port to match your printer, select the **Serial Port Setup** command from the **DownLoad** menu.



Searching Options

To find the location of a specified word or group of characters, use Cricket Draw's search capabilities to do this for you automatically.

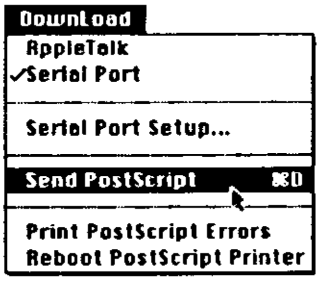


A number of options can be set before searching. You can choose to have the search algorithm look only for whole words. You can also search backwards through the text. If it is important that the search be case sensitive so that it treats an "A" different than an "a", select the case sensitive option. To select these search options, select the appropriate command from the **Search** menu. If the option is currently on, a check mark appears beside the menu command. To turn a checked menu command off, select the command again.

Searching always begins from the current editing point, indicated by the location of the flashing I-beam cursor.

Sending the PostScript

After selecting the proper port, select the **Send PostScript** command from the **DownLoad** menu. The contents of the active PostScript window are transmitted to the printer.



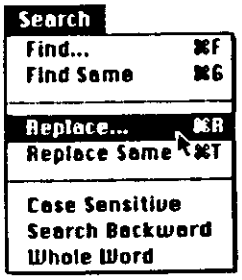
Print Those Errors!

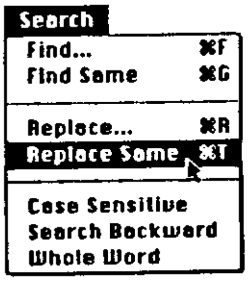
When transmitting PostScript to a printer, the printer can encounter an error in the PostScript code and be unable to continue the imaging process. If this happens, most printers stop the imaging and present no warning that something went wrong. If you try to send an image to a PostScript printer and nothing is printed, an error in the PostScript was probably encountered.

Cricket Draw provides a partial remedy for this situation which eases the process of finding and removing errors from a PostScript program.

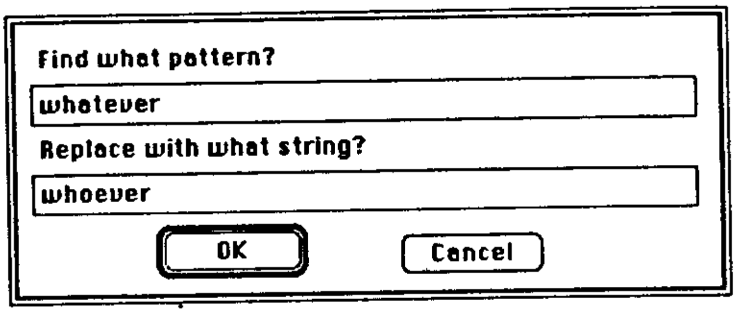
Replacing

To replace one word with another, use the **Replace** command.





Replace and **Replace Same** from the **Search** menu operate like the **Find** and **Find Same** commands. The difference is that you specify the replacement text as well as the search text.



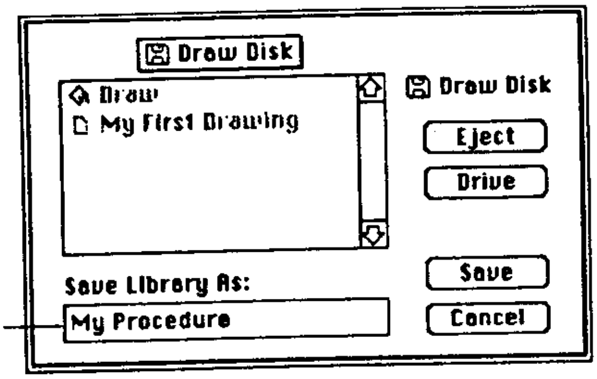
Find what pattern?

whatever

Replace with what string?

whoever

By selecting **Reboot PostScript Printer** from the **DownLoad** menu, a small PostScript program is downloaded to the printer which causes the printer to restart (referred to as "Booting"). This procedure is only guaranteed to work on the Apple LaserWriter, but should also work on most PostScript printers.

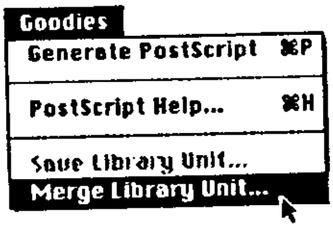


Save Library As: My Procedure

Enter a name to save the library under

Select the folder you wish to save this library unit in and enter a name for the unit. After clicking the **Save** button, the library unit is saved to disk.

Saved library units can be merged with any PostScript program by selecting **Merge Library Unit** from the **Goodies** menu. The library unit is merged with the PostScript text at the current insertion point, so you must place the selection point in the proper location first.



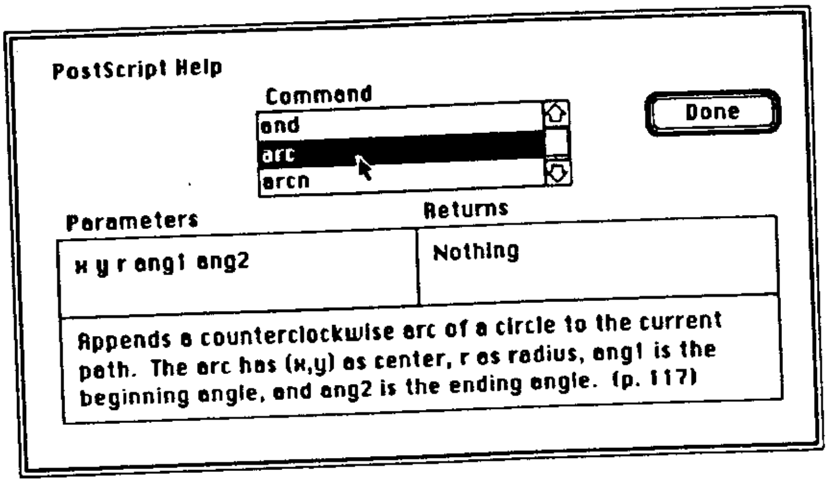
After selecting the merge function, a dialog box appears allowing you to choose the library unit you wish to merge into the PostScript program.

Appendix A
PostScript Printers

A wide variety of PostScript compatible printers are currently on the market. The number of printers listed below indicates how popular PostScript has become over the last year.

- Agfa-Gevart P400PS
- Apollo Computer Domain/Laser-26
- Apollo Computer SFW-Post-MMP
- Apollo Computer SFW-Post-VERS
- Apple LaserWriter
- Apple LaserWriter Plus
- Dataproducts LZR-2665
- DEC PrintServer 40
- Laser Connection PS Jet
- Linotype Linotronic 100
- Linotype Linotronic 300
- NBI 908
- QMS-PS 800
- QMS-PS 2400
- Sun LaserWriter
- Texas Instruments 2108
- Texas Instruments 2115

The list grows each month and therefore this list is probably incomplete.



Parameters: x y r ang1 ang2

Returns: Nothing

Appends a counterclockwise arc of a circle to the current path. The arc has (x,y) as center, r as radius, ang1 is the beginning angle, and ang2 is the ending angle. (p. 117)

Scroll through the list of commands until the command of interest is visible. Click on the command word. A short description of the command is listed along with the parameters expected and any items that this command returns. The page number refers to the page detailing the command in the PostScript Language Reference Manual (Listed as a reference at the back of this manual).

Sending the PostScript

Once you have a PostScript program entered in a PostScript window, you can send it to a PostScript printer. The first step in sending a PostScript file to a printer is to select the proper port. The Apple LaserWriter and several other printers operate via AppleTalk and therefore the AppleTalk option should be selected. Many PostScript printers do not operate on AppleTalk but must be connected to a serial port.

Appendix B
MacDraw, PICT, Cricket Draw and EPSF Formats

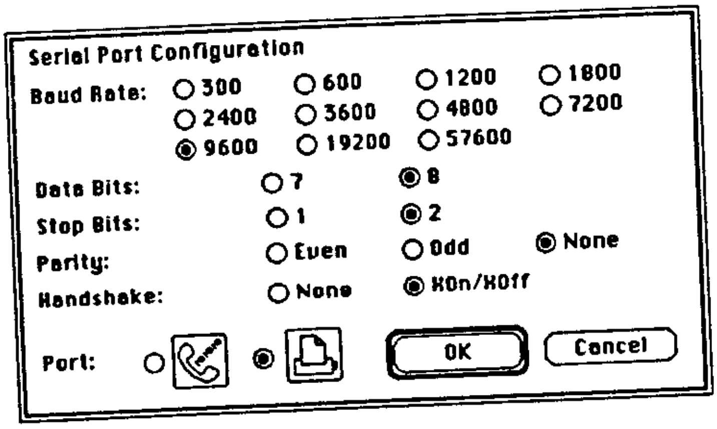
Cricket Draw can read a variety of file formats: MacDraw format, PICT format, and its own internal data format. Drawing files can also be saved in a variety of file formats: PICT format, Cricket Draw's own internal format, and Encapsulated PostScript File (EPSF). The PostScript representation of the drawing can also be saved as an ASCII text file.

MacDraw Files

Cricket Draw can read drawings saved by MacDraw in the "MacDraw format". The MacDraw format is proprietary to Apple Computer, so the file format is not published here. Cricket Draw automatically lists all MacDraw files in the Open dialog. Double-clicking on a file name opens that file.

Cricket Draw does not save drawings in MacDraw format. You can, however, save drawings in "PICT" format. MacDraw can read PICT files.

A dialog box appears allowing you to set parameters which vary from printer to printer.


Serial Port Configuration

Baud Rate: ○ 300 ○ 600 ○ 1200 ○ 1800
○ 2400 ○ 3600 ○ 4800 ○ 7200
● 9600 ○ 19200 ○ 57600

Data Bits: ○ 7 ● 8

Stop Bits: ○ 1 ● 2

Parity: ○ Even ○ Odd ● None

Handshake: ○ None ● XOn/XOff

Port: ○ ☎ ● 🖨

Consult your printer's manual to determine the proper baud rate, data bits, stop bits, parity and handshaking and then set the appropriate buttons. You must also select to which of the two Macintosh serial ports the printer is connected. The two icons for the ports represent the modem port and the printer port. These icons match the icons you find above each port on the Macintosh case.

It doesn't matter which serial port you connect your printer to, as long as you set the proper button in this dialog.

Cricket Files

The Cricket format is proprietary to Cricket Software and is not published. The general method of transferring graphic images to other applications is the PICT file format.

Saving a drawing in Cricket format should only be done if you are only going to use the image in Cricket Draw. Otherwise, you should save your drawings in PICT format.

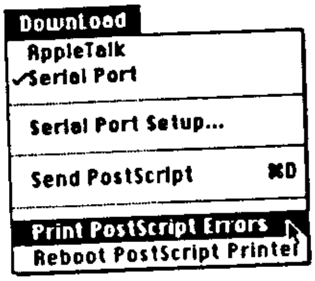
By using the Cricket format, your image files are much smaller and special effects such as fountains and shadows are left intact.

EPSF (Encapsulated PostScript File)

The EPSF format is a somewhat new format originally drafted by Jim Von Ehr of Altsys Corporation. Each Macintosh file has a data fork and a resource fork. EPSF places the PostScript description of the drawing in the data fork of the file as text. The QuickDraw screen representation of the drawing is placed in the resource fork as a PICT resource. Further details on this file format can be obtained by writing to:

AltSys Corporation
720 Avenue F, Suite 108
Plano, Texas 75074

Cricket Draw supports this format merely as a convenience to you and the EPSF standard is not endorsed by Cricket Software. A number of other applications are planning to use EPSF and that is why it is provided as an option. It is suggested that you use the PICT format as a general rule of thumb. EPSF has no advantages over the way Cricket Draw uses the PICT format. In fact, the PICT format is much more universal to a wider number of Macintosh applications. You do not gain any advantages by using the EPSF option.

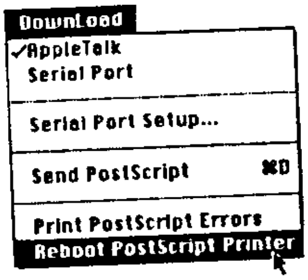


Select **Print PostScript Errors** from the **DownLoad** menu. A small PostScript program is downloaded to the printer. Whenever the printer encounters a PostScript error, it prints the image it has received thus far, and then prints what kind of error was encountered.

Errors continue to be reported until you either shut the printer off or the printer is rebooted. At any time, you can reload the error handler routine into the printer.

When All Else Fails - Reboot

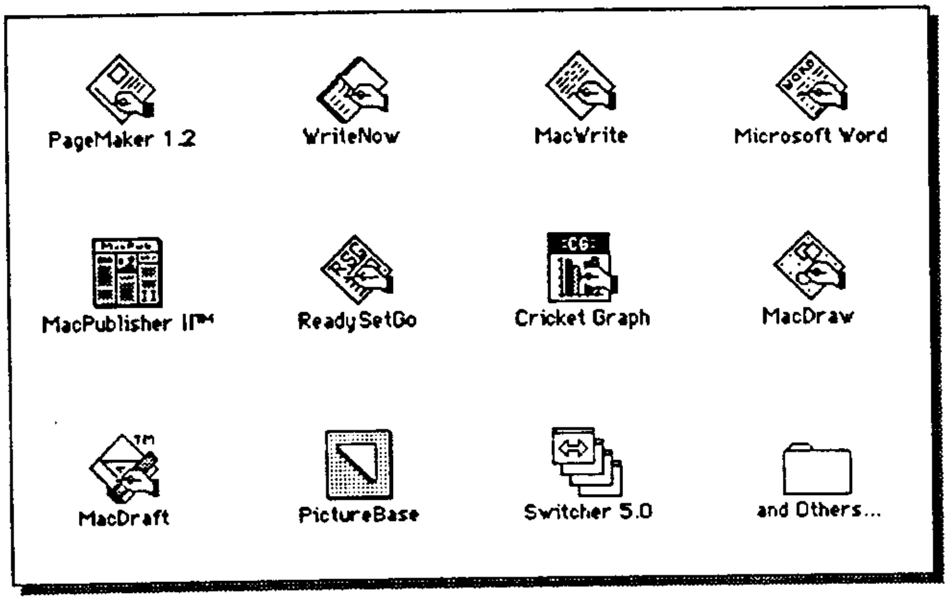
An error can be encountered that causes the PostScript printer to freeze. When this happens, you must reboot the printer.



Appendix C
Using Cricket Draw with Other Products

Cricket Draw allows you to create highly customized PostScript images. You can transfer these images to other applications and they print just as they do in Cricket Draw. This capability is what makes Cricket Draw so valuable when working in a desktop publishing scenario.

The method of transfer for graphic images between Cricket Draw and other applications depends upon the application. In most cases, the transfer is accomplished through PICT files or the Clipboard. The following information is intended as a brief guide for a number of Macintosh applications.



MacPublisher II™

MacPublisher, like PageMaker, can place PICT files into a document. Save the drawing, in Cricket Draw, as a PICT file. Then read the PICT file in with MacPublisher.

ReadySetGo™

Past versions of ReadySetGo could only paste PICTs from the Clipboard or Scrapbook. New versions may allow you to read the PICT files from disk.

Cricket Graph

Cricket Graph can not read Cricket Draw files, but images created in Cricket Draw can be pasted into Cricket Graph via the Clipboard and the Picture tool in the Tools palette.

More importantly, graphs created in Cricket Graph can be moved to Cricket Draw for further enhancement. Cricket Graph allows you to save graphs in PICT format and Cricket Draw can read this format directly. Creating graphs in Cricket Graph and then moving them into Cricket Draw for enhancement, is an unbeatable combination for creating presentations.

Switcher™

No one application can serve everyone's needs. That is what makes Switcher so valuable. You can have a number of applications loaded into the Macintosh at once and instantly switch from one to another. Because Cricket Draw works so well with a wide number of applications, Switcher is extremely valuable in allowing you bundle the applications you need to accomplish your work.

You do not need to specify the memory size in Switcher when installing Cricket Draw. The Cricket Draw program automatically requests 300K of memory from Switcher. This allows ample working space for Cricket Draw. However, if you are working with very complex images that include a lot of fountains and shadows, increase the memory allotted by Switcher by as much as can be spared.

Other Applications

In most other Macintosh applications, you can transfer graphics from the application to Cricket Draw, and vice versa, through either the Clipboard or PICT files.

PICT Files

When copying a graphic object or image from a Macintosh application to the Clipboard or Scrapbook, the PICT format is used. The PICT file format is the universal format for transfer of graphic images between Macintosh applications, and is documented in technical notes published by Apple Computer.

PICT files are also directly readable by a number of Macintosh applications including Aldus PageMaker and MacPublisher II.

Cricket Draw places the Macintosh screen representation (QuickDraw) and PostScript page description into the PICT file. This has the advantage that transfer of an object into another Macintosh application also transfers the PostScript description with it. Therefore, complex images can be pasted into another application and as long as the Apple LaserWriter driver or Aldus driver (Version 2.0) is being used, the image is printed properly from that document.

The PICT files from Cricket Draw are bigger than the PICT files created by other Macintosh applications. This is because the PostScript code is placed in the PICT.

Appendix D
Cricket Draw's PostScript Procedures

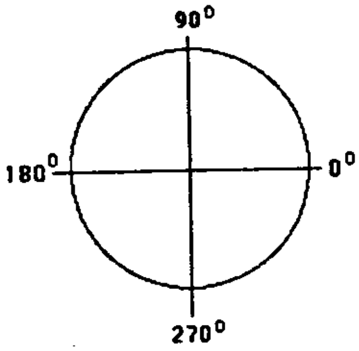
An understanding of PostScript is necessary for proper understanding of this appendix. The reference list at the back of this manual lists two books on PostScript published by Addison-Wesley. If you are interested in programming directly in the PostScript language, you can use these books and this appendix.

Also, Adobe Systems, the originators of the PostScript language, offers several courses in PostScript programming. If you are interested, you may want to contact them at:

Adobe Systems, Incorporated
1870 Embarcadero Road
Palo Alto, CA 94303
(415) 852-0271

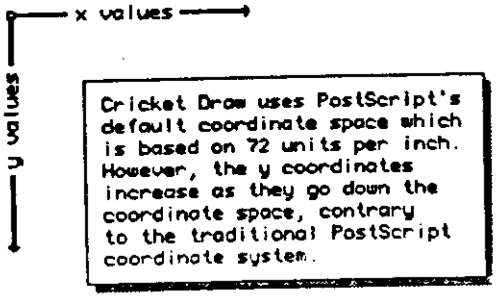
A number of PostScript procedures are sent to the PostScript printer before the actual PostScript code which describes the drawing. This group of procedures is referred to as the "Header". They are then called to create the objects and special effects that are used in the drawing. If you are going to program directly in PostScript using the PostScript window, you can also use these pre-built procedures.

A couple of items must be kept in mind when using the PostScript window in Cricket Draw to program in the PostScript language.



Angular Coordinates

Angles are defined in a counterclockwise direction with 0 degrees at the 3 o'clock position.



Cricket Draw uses PostScript's default coordinate space which is based on 72 units per inch. However, the y coordinates increase as they go down the coordinate space, contrary to the traditional PostScript coordinate system.

The coordinate system used by Cricket Draw increases in the horizontal direction from left to right. The vertical coordinates increase from top to bottom (contrary to traditional PostScript coordinates).

Aldus PageMaker™

PageMaker can place PICT files into the document directly without going through the Clipboard. After creating the drawing in Cricket Draw, save the drawing to a disk file using the PICT format. This file can then be read directly by PageMaker using the **Place** command. You need Version 2.0 of Pagemaker for the drawing to print correctly as it does in Cricket Draw.

WriteNow™

WriteNow, from T/Maker, allows you to paste PICT items from the Clipboard. Therefore, you can transfer images from Cricket Draw to WriteNow through the Clipboard or Scrapbook.

MacWrite™

MacWrite also allows you to paste PICT items in from the Clipboard. In Cricket Draw, you can copy any or all of the items in a drawing to the Clipboard. Once on the Clipboard or in the Scrapbook, a Cricket Draw image can be pasted into a MacWrite document.

Microsoft Word

Microsoft Word, like MacWrite, allows you to paste graphic images in from the Clipboard. Use Cricket Draw to create the image and then copy to the Clipboard or Scrapbook.

Defining New Paths

The next group of procedures actually define an object. In PostScript terms, they define paths. A path is a set of straight lines and curves that define a region to be filled or represent a trajectory to be drawn. Each object in the tools palette, except text, has a corresponding PostScript procedure which describes its path.

Procedure: *doarc*

Purpose:	Creates an elliptical arc starting at a specified starting angle and continuing to a specified ending angle. The central point of the arc is expected to be centered on (0,0).
Parameters:	x radius & y radius of the bounding oval the beginning angle the ending angle
Example:	**50 100 0 90 doarc** Creates an arc path which is defined by a bounding oval with an x radius of 50 and a y radius of 100 around the (0,0) coordinate. The arc begins at 0 degrees (3 o'clock position) and ends at 90 degrees (12 o'clock position).

MacDraw™

MacDraw saves images in MacDraw format or PICT format. Both are readable by Cricket Draw.

When moving images from Cricket Draw to MacDraw, the drawings can be saved as PICT files, which MacDraw can read. MacDraw may or may not be able to display the file properly, because Cricket Draw performs complex region manipulation to emulate PostScript.

MacDraft™

MacDraft documents, like MacDraw, can be saved in PICT format. Cricket Draw can then read these files directly. Moving drawings from Cricket Draw to MacDraft can also be done via the PICT file, but like MacDraw, the screen representation may or may not appear correctly.

PictureBase™

The images from Cricket Draw can be saved into PictureBase. PictureBase is a database for graphic images and if you need to file a large number of drawings created with Cricket Draw, then you should consider this product.

Likewise, current bitmap or object-oriented clip art can be transferred from PictureBase into Cricket Draw via the Clipboard or Scrapbook.

Procedure: *dodiamond*

Purpose: Creates a diamond path defined by the midpoints of each line segment in an imaginary bounding rectangle.

Parameters: width
height

Example: **100 200 dodiamond**
A diamond is created with a width of 100, a height of 200 with its central point based on (0,0).

Procedure: *dograte*

Purpose: Defines a series of horizontal lines which are clipped by a path described by four points. The number of lines in the grate can be specified as well as linear or log spacing.

Parameters: (x1,y1), (x2,y2), (x3,y3), (x4,y4) bounding points
the number of parallel lines
true or false for log spacing

Example: **10 20 100 20 100 80 10 80 20 false dograte**
A path bordered by the four (x,y) pairs is used to clip 20 parallel lines. The lines space linearly.

Procedure: *dosmoothpoly*

Purpose: Creates a path using a Quadratic B-Spline curve computed from the points in an array.

Parameters: an array of points

Example: **myArray dosmoothpoly**
Constructs a smoothed path using the x-y pairs found in the array *myArray*.

Procedure: *dobitmap*

Purpose: Images a bitmap, in hexadecimal form, onto the drawing. This procedure is designed for black and white images only. Halftone images cannot be used with this procedure.

Parameters: width
height
follow *dobitmap* with the hexadecimal data

Example: **200 100 dobitmap 0020 0A01 ...**
Creates a bitmap in PostScript with a width of 200 units and a height of 100 units. The call to dobitmap is followed a sequence of hexadecimal digits representing the image.

The procedures are broken up into three main groups: a procedure that alters the coordinate system, procedures that create paths (the object description), and procedures that operate on paths (such as any of the special effects).

For each group of procedures, a quick explanation is first presented, followed by the name of each procedure in that group, its function, and the parameters that it expects. An example of how to call each procedure is also given.

NOTICE:
When writing your own PostScript program, you can use any of these procedures. However, you must be certain to include the following line within your PostScript program...

%%LoadPrep:Cricket Procedures

This causes any downloading of the PostScript window contents to include these procedures. Be careful to enter the above line exactly as it appears.

Example: **10 -15 0 8 4 shadow**
A shadow extending to the upper (15 units) right (10 units) is placed on a previously defined path beginning with a black edge (0) and shading through to a light gray edge (8), with a darker outer border (4).

Procedure: *charshadow*

Purpose: Similar to shadow except that this procedure applies to a string of text.

Parameters:
x depth (postive or negative)
y depth (positive or negative)
beginning gray (starting from the path itself)
ending gray (towards the far end of the shadow)
edge gray (the very outer edge of the shadow)
additonal width to add to space characters
additional width to add to any other characters
the string of text

Example: **10 -15 0 8 4 0.5 0.2 (ABC) charshadow**
A shadow extending to the upper (15 units) right (10 units) is placed on the text string "ABC" beginning with a black edge (0) and shading through to a light gray edge (8), with a darker outer border (4). An additonal amount of 0.5 units are added to all space characters in the string and 0.2 units to all aditional characters. The space adjustment is mainly for the purpose of text justification.

Gray scales are represented with values between 0 and 1 with 0 representing black and 1 representing white.

Altering the Coordinate System

To alter the coordinate system, only one procedure is used. If you intend to modify the PostScript coordinate system, the order in which you call the coordinate transforms (e.g., translation, reflection, rotation, etc.) is extremely important. By passing a few parameters and calling the one procedure provided by Cricket Draw, you need not worry because the transforms are called in the proper order for you.

Procedure: *fixcoordinates*

Purpose:	Translates, rotates, reflects and tilts the coordinate system used by PostScript. Intended to be used before calling any of the path description routines.
Parameters:	x & y for translation (the center of the object) the rotation angle in degrees (±) true or false for x-axis reflection true or false for y-axis reflection the degree of tilt (±)
Example:	**100 200 45 true false 0 fixcoordinates** This translates the (0,0) point of the coordinate axes to (100,200), rotate 45 degrees, reflect about the x-axis, don't reflect about the y-axis and no tilting.

Procedure: ***pathtext***

Purpose:	Positions a string of text along a previously defined arbitrary path.
Parameters:	the string of text the beginning offset from the start of the path
Example:	**(Hello there!) 5 pathtext** "Hello there!" is placed along a previously defined path starting at 5 units from the beginning of the path.

Procedure: ***makeoutlinefont***

Purpose:	Creates a "true" outline font based on any other font
Parameters:	the base font name new font name
Example:	**/Helvetica /OutlineHelvetica makeoutlinefont** Creates an outline font named "OutlineHelvetica" from the existing font named "Helvetica"

Procedure: *dorect*

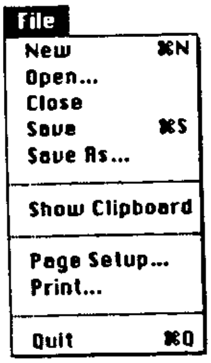
Purpose:	Creates a rectangular path with a specified x & y width. It is centered on (0,0).
Parameters:	width height
Example:	**100 200 dorect** A rectangle with a width of 100 units and a height of 200 units is positioned with the central point of the rectangle located at (0,0).

Procedure: *doroundrect*

Purpose:	Similar to the dorect procedure except that the corners of the rectangle are rounded by a specified amount.
Parameters:	x radius of the oval that describes the corners y radius of the oval that describes the corners width height
Example:	**10 20 100 200 doroundrect** A rounded rectangle is created with a width of 100, a height of 200 and the corners described by an arc with an x radius of 10 and y radius of 20. Its central point is based on (0,0).

Appendix E
A Quick Tour of the Menus...

Menus available when the active window is a Drawing window.



New ⌘N
New opens a new Drawing window or PostScript window.

Open...
Opens and retrieves an existing drawing that has been previously saved.

Close
Close puts puts away the active window.

Save ⌘S
The Save command saves the contents of the active drawing window on disk for later recall.

Procedure: ***dostarburst***

Purpose: Creates a path defined by a series of radiating lines extending a specified distance from a central point. The radial lines are bounded by an imaginary oval so the vertical and horizontal radii can differ.

Parameters:
x radius of the oval that bounds the starburst
y radius of the oval that bounds the starburst
beginning angle
incremental angle
ending angle

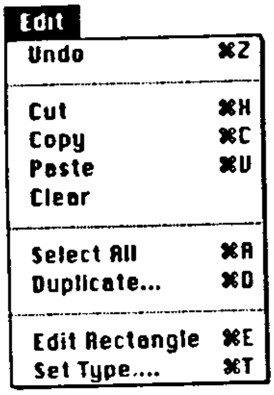
Example: **50 100 0 5 180 dostarburst**
A series of radiating lines bounded by the oval with a x radius of 50, y radius of 100 and a central point based off of (0,0) is defined. The beginning angle is 0 degrees and the ending angle at 180 degrees. Lines are drawn every 5 degrees between these two angles.

Procedure: ***dopoly***

Purpose: Creates a path using the (x,y) points in an array.

Parameters: an array of points

Example: **myArray dopoly**
Constructs a path using the x-y pairs found in the array *myArray*.



Undo ⌘Z

The Undo command is used to undo the last action that occurred in the drawing window. If Cricket Draw is unable to undo the last operation, this menu command reads Can't Undo and becomes inactive.

Cut ⌘X

The Cut command removes selected objects from the drawing and places them on the Clipboard.

Copy ⌘C

The Copy command makes a copy of the selected objects in the drawing window and places them on the Clipboard.

Paste ⌘V

The Paste command replaces the currently selected object(s) with the object(s) on the Clipboard. If no objects are selected, the Clipboard contents are simply placed in the drawing window.

Clear

The Clear command removes selected objects from the drawing window.

Operating on Paths

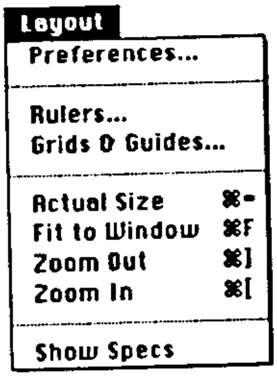
Once a path is defined, the procedures in this group operate on the last defined path. These procedures create the special effects such as fountains and shadows.

Procedure: *strokearrow*

Purpose:	Places an arrowhead at the beginning, ending, or both ends of a previously defined path. The arrowhead thickness and length is based on the current line width.
Parameters:	true or false for arrowhead on beginning of path true or false for arrowhead on end of path
Example:	**true false strokearrow** Places an arrowhead on the beginning of the previously defined path.

Procedure: *shadow*

Purpose:	Creates a shadow based on a previously defined path (Do not use for text).
Parameters:	x depth (postive or negative) y depth (positive or negative) beginning gray (starting from the path itself) ending gray (towards the far end of the shadow) edge gray (the very outer edge of the shadow)



Preferences...

Preferences allows you to create PostScript programs using either black and white or color. You can also set the background and a number of other preferences by using this command.

Rulers...

The Rulers command allows you to pick and display one of four types of rulers along the top and left edges of the drawing window.

Grids & Guides...

Grids and Guides can be used to set grids and guide lines for assistance in aligning objects. You can also set grid or guide snap so that objects may be more precisely positioned than the Macintosh screen allows.

Actual Size ⌘=

Actual Size causes the drawing to be displayed at actual size.

Procedure: *fountain*

Purpose: Applies a linear or log fountain through a previously defined path at a specified angle.

Parameters:
beginning gray
ending gray
fountaining function (either "/linearfn" or "/logfn")
the fountain angle

Example: **1 .9 logfn 45 fountain**

Applies a fountain through a previously defined path at a 45 degree angle. The gray scale goes from .1 to .9 and the fountain is based off a log transition. [Note: You could pass your own function.]

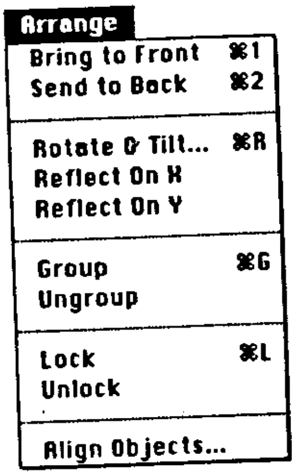
Procedure: *radialfountain*

Purpose: Applies a circular fountain through a previously defined path with the starting gray at the center of the path.

Parameters:
beginning gray
ending gray

Example: **.1 .9 radialfountain**

Applies a radial fountain through a previously defined path. The gray scale will go from .1 to .9 .



Bring to Front ⌘1

Bring to Front changes the stacking order of objects so that the selected object is brought to the front of all other objects in the drawing.

Send to Back ⌘2

Send to Back changes the stacking order of objects so that the selected object is placed behind all other objects in the drawing.

Rotate & Tilt... ⌘R

Rotate & Tilt allows you to rotate and tilt the selected object(s) a specified number of degrees.

Reflect On X

Reflect On X reflects the selected object(s) about the x axis.

Reflect On Y

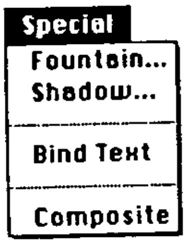
Reflect On Y reflects the selected object(s) about the y axis.

Procedure: ***makeunderlinefont***

Purpose: Creates a an underline font based on any other font

Parameters: the base font name
new font name

Example: **/Helvetica /UnderlineHelvetica makeunderlinefont**
Creates an underline font named "UnderlineHelvetica"
from the existing font named "Helvetica"



Fountain...

Fountain is a technique of shading the interior of an object from a dark gray to a light gray (or from color to color). You can specify the angle as well as the beginning and ending gray values (or color).

Shadow...

Shadow allows you to place a shadow behind one or more objects in the direction and depth that you specify. You can control the range of gray or color to be used in the shadowing.

Bind Text / Unbind Text

If an open ended object, such as an arc, and a text object are selected, Bind Text places the text along the path described by the open-ended object.

Composite ✓

Composite allows you to draw a sequence of open-ended objects from end to end while in the Composite mode. The composite mode is active when this menu item is checked. To complete the composite, select this command again. Creating composites is a way to use Bezier curves, arcs, lines and polygons in defining the boundary of an object.

Save As...
Save As allows you to save the contents of the active drawing window on disk under a new name.

Show Clipboard / Hide Clipboard
The Show Clipboard command opens or closes a window that displays the current contents of the Clipboard.

Page Setup...
Page Setup lets you specify the paper size and other printer characteristics.

Print...
The Print command prints a copy of the active drawing window using the settings specified by Page Setup.

Quit ⌘Q
Quit leaves Cricket Draw and returns to the Finder.

Close

Closes the active window.

Save ⌘S

The Save command saves the PostScript in the active PostScript window on disk for later recall.

Save As...

Save As allows you to save the contents of the active PostScript window on disk under a new name.

Show Clipboard / Hide Clipboard

The Show Clipboard command opens or closes a window that displays the current contents of the Clipboard.

Page Setup...

Page Setup lets you specify the paper size and other printer characteristics.

Print Window... / Print Selection

The Print Window command prints the contents of the active PostScript window using the settings specified by Page Setup. If a range of text in the PostScript window is selected, this command changes to Print Selection so that only the currently selected text is printed.

Quit ⌘Q

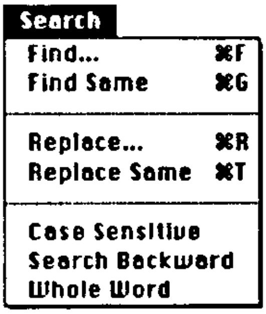
Quit leaves Cricket Draw and returns to the Finder.

Select All ⌘A
Select All can be used to select all objects in the drawing window.

Duplicate... ⌘D
Duplicate allows you to create a copy of selected objects and place the duplicate slightly offset from the originals. You can specify how many times to duplicate the selected objects and the vertical and horizontal offsets for each duplicate.

Edit [Object] **⌘E**
Edit [Object] reflects the currently selected object. for instance, if the object is a rectangle, the menu command reads "Edit Rectangle". After the selecting this command, you can modify the vertices of the rectangle. The editing operations available depend upon the kind of object selected.

Set Type... ⌘T
If you are editing a block of text and have selected a range of text, you can select Set Type to modify the text. Font, style and size are a few of the text characteristics which can be set from this command.



Find... ⌘F

Find allows you to specify a search string. Once the string is found, it is highlighted and selected. Searching begins at the current selection point.

Find Same ⌘G

Find Same locates the next occurrence of the string previously specified in Find.

Replace... ⌘R

Replace allows you to specify a search string and replace this string with another string. Once the string is found, the string is selected and replaced with the specified replacement string. Searching begins at the current selection point.

Replace Same ⌘T

Replace Same continues to find the next occurrence of the string you wish replaced. Once found, the string is deleted and the replacement string inserted.

Fit to Window ⌘F

Fit to Window causes the entire drawing area to be sized so that it can be displayed in a single window.

Zoom Out ⌘]

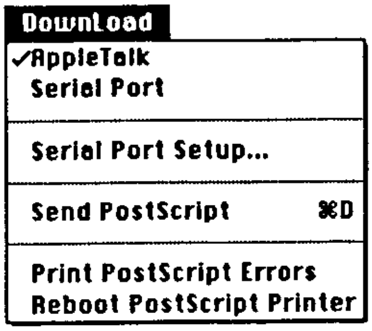
Each time you select Zoom Out, the drawing size is reduced by a factor of 2. You can continue to select Zoom Out until you reach a maximum reduction of 1/8x.

Zoom In ⌘[

Each time you select Zoom In, the drawing size is magnified by 2x. The maximum enlargement is 8x.

Show Specs / Hide Specs

Show Specs causes dimension lines to appear when creating or resizing objects. The dimensions displayed represent the units of the current ruler system. Hide Specs turns off the Show Specs feature.



AppleTalk ✓

The AppleTalk should be selected (indicated by a check mark) when you use a PostScript printer that is connected via AppleTalk.

Serial Port ✓

The Serial Port command allows you to specify the serial port as the connection to the PostScript printer.

Serial Port Setup...

The Serial Port Setup command allows you to select which one of the Macintosh serial ports is to be used and configure it for your printer.

Send PostScript ⌘D

The Send PostScript command takes the contents of the active PostScript window and sends it to the printer via the selected port.

Print PostScript Errors

The Print PostScript Errors command downloads a small PostScript program to the printer so that any errors encountered by the printer are printed on the current page. This is very useful for debugging a PostScript program.

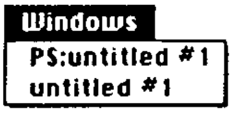
Group ⌘G
Group allows you to select two or more objects and group them so that they act as one object.

Ungroup
Ungroup allows you to ungroup a previously grouped object into its individual components.

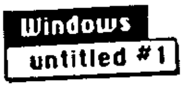
Lock ⌘L
The Lock command is used to lock an object(s) so that accidental changes cannot be made. Locked objects cannot be moved until they are unlocked.

Unlock
Unlock allows you to remove the locked feature of one or more objects so that changes can be made.

Align Objects...
Align objects allows you to align multiple objects. Several points of alignment are available.

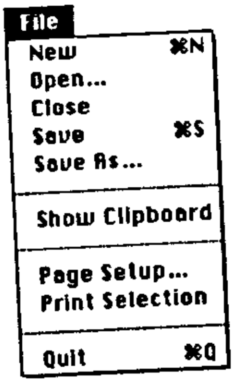


The windows menu lists the name of each window currently open. By dragging to the name of the window of interest, that window is brought to the front and made active.



The windows menu lists the name of each window currently open. By dragging to the name of the window of interest, that window is brought to the front and made active.

Menus available when the active window is a PostScript window.



New ⌘N
New opens a new Drawing window or PostScript window.

Open...
Opens and retrieves an existing PostScript program that has been previously saved.

A

active window 36
actual size 91
align objects 79-80
animation 45, 107
AppleTalk connection 136
arc 67, 90
arrows
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background 43
Bezier curve 71,90
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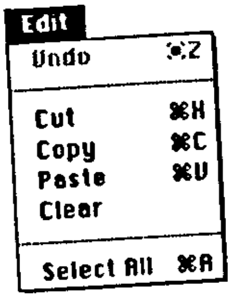

Undo ⌘Z

The Undo command is not active while working in the PostScript window.

Cut ⌘X

The Cut command removes selected text from the PostScript window and places it on the Clipboard.

Copy ⌘C

The Copy command makes a copy of the selected text in the PostScript window and places it on the Clipboard.

Paste ⌘V

The Paste command replaces the currently selected text with the text on the Clipboard. If text is not selected, the Clipboard contents are placed at the location of the flashing cursor in the PostScript window.

Clear

The Clear command removes selected text from the PostScript window.

Select All ⌘A

Select All can be used to select all text in the PostScript window.

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Case Sensitive ✓

Case Sensitive is a switch which causes upper and lowercase characters to be treated as separate characters when searching is performed. The command is checked when this option is on.

Search Backward ✓

Search Backward causes any searching to be performed from the current selection point to the front of the text. The command is checked when this option is on.

Whole Word ✓

Whole Word is a switch which causes the search to locate only strings that are whole words and not part of another word. The command is checked when this option is on.

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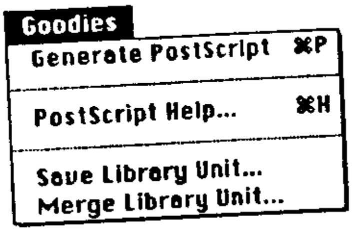
Reboot PostScript Printer

PostScript printers can lock up when certain errors are encountered. The only recourse is to utilize the Reboot PostScript Printer command to cause the printer to be started up from scratch.



Generate PostScript ⌘P

You can convert the drawing in the frontmost drawing window into PostScript by using the Generate PostScript command. The PostScript is placed in the active PostScript window.

PostScript Help... ⌘H

Selecting PostScript Help allows you to inquire about the available PostScript commands, their required parameters and the results returned from each command.

Save Library Unit...

Selected PostScript text from the active PostScript window can be saved as a library unit for later recall. You must select a range of text in the PostScript window for this command to be active.

Merge Library Unit...

Previously saved library units can be merged into a PostScript window. The merger occurs at the current selection point in the active PostScript window.

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